

The Iron Age

A Review of the Hardware and Metal Trades.

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Pumping Engine for the Pittsburgh Water Works.

For some time past there has been ample evidence afforded that the rapid growth of Pittsburgh was placing a demand on the existing means of water supply which it could not satisfy. New water works are, therefore, in process of construction, and the pumping will be done by perhaps one of the most remarkable engines ever used for such a purpose, and essentially different in every arrangement from any

above the top of the bed plate; between these two, and connected by the proper rods, is placed, as called by the inventor, a quadrant or "triangular beam." The plunger blocks in which the quadrant vibrates are situated 25 ft. 11½ in. from center of the fly-wheel shaft, and 9 ft. 15-16 in. above the top of the bed plate. The lower wrist pin of the quadrant is attached to the connecting rods from the cylinder and fly-wheel, and vibrates horizontally; to the two upper wrist pins are attached the connecting rods from the pumps, which are placed in the

is short, and the leverage of the pump is long; as the pressure is diminished the leverage of the pump rod diminishes, until at half the leverage are equal; beyond this point the leverage of the plunger making the down stroke increases, and thus helps to raise the other plunger. These are the main features claimed by the inventor.

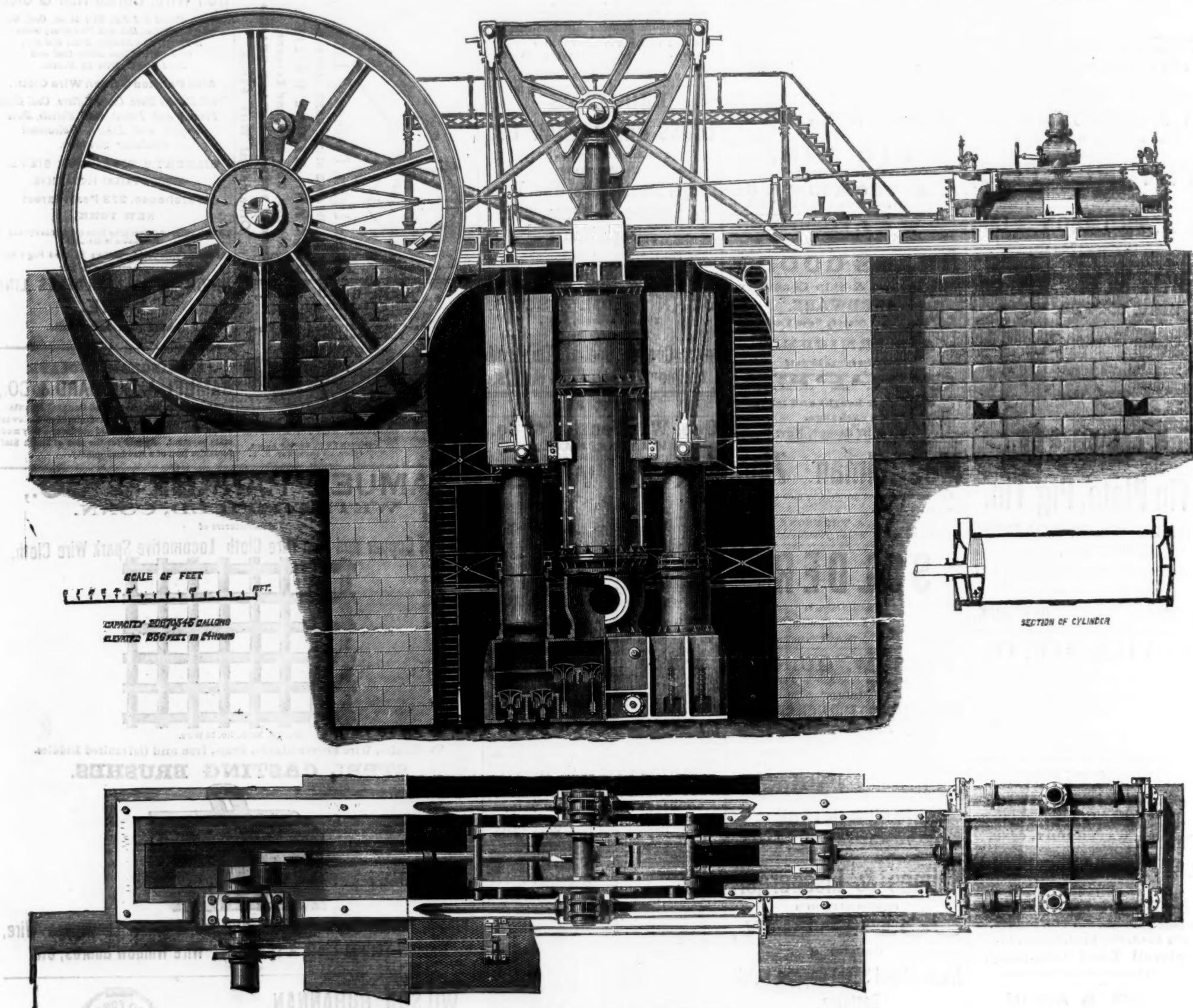
The engines have two horizontal steam cylinders connected with one shaft by two cranks fitted at right angles, one fly wheel and shaft serving both engines. The steam is to be ad-

with double shells, the inside shell to be 1½ in. thick, concave; the outside shell neatly turned and finished to 1½ in. thick, convex; the two shells being well supported with eight ribs, 1½ in. thick, and uniting the two shells.

The piston will have three composition packing rings made of eight parts new copper and one part new tin; the rings to be fitted in the usual manner with Babbitt metal. Each ring is 2½ in. wide, the three rings making 7½ in. width of face, and 1 in. and 1½ in. thick. The inside packing ring is to be made of good cast

packing rings are ground is 2 in. thick. The piston rod is 10 in. in diameter, the end of the rod, which is fitted into the piston head, being swelled, so that after the key way is cut there will remain an equal number of square inches with the main rod.

The steam and exhaust valves are what is known as balance poppet valves, constructed so that they can be lifted from their seats through the upper openings in the valve chambers, each pair of valves, with their wings, being cast together. The combined area of each pair of



PUMPING ENGINE FOR PITTSBURGH WATER WORKS.

horizontal engine with which we are acquainted. Our illustrations represent an elevation of the engine and pumps, and plan of the engine.

The engine is being built by Andrew Hartup, Pittsburgh; the contract price, not including boilers, foundations, or house, but including erection, is \$423,550. The engine is estimated to pump something over 41,000,000 gallons to Hilland avenue reservoir in 24 hours, under a static head of 356 ft. The diameter of the rising main is not yet determined on, but a 50 in. main has been talked of; the length will be about 2700 ft. It will be seen from the engraving that at one end of a long bed plate to the right is placed a horizontal cylinder, the center line of which is 1½ in. above the top of the bed plate, and at the other end, 62 ft. 4½ in. distant from center to center, is placed the fly-wheel, the center of the plunger blocks being 3½ in.

pump well below the bed plate, and are distant horizontally from center to center 13 ft. 2 in., and have a stroke of 11 ft. Counter weights are placed on the pump rods of sufficient weight to force the water to the reservoir without the aid of the steam or fly-wheel, the weight being raised by the steam and allowed to fall, thus forcing the water to the reservoir. The inventor proposes to use steam of from 80 to 100 lb. pressure, and to cut off at from one-fourth to one-fifth of the stroke. The idea of the inventor is this, supposing the piston at the end of the stroke, at this point the leverage of the lower wrist pin, is short compared to what it will be at half stroke; at the same time the leverage of the wrist pin that has made its down stroke is at a maximum, and that on the up stroke at a minimum. Thus when the steam is at its greatest pressure the leverage of the lower wrist pin

mitted into the cylinders at from 80 lb. to 100 lb. pressure to the square inch, following the piston in the cylinder from one-fifth to one-fourth of the stroke, then cut off and expanded for the remainder of the stroke, and condensed either by a jet or surface condenser, as may be hereafter determined. The engines will operate four single-acting graduating plunger pumps, two pumps being connected with each steam engine, and working vertically. Nothing will give a better idea of the importance of this work than the dimensions of the machinery.

The steam cylinders will have a stroke of 14 ft., and will be 64 in. in diameter. The walls of the cylinders will have a thickness when finished of 2¾ in., increased to 3½ in., where the middle and end lugs join the cylinder. The flanges of the cylinder will be 3½ in. thick and 3 in. wide. The cylinder heads will be cast

iron 7½ in. wide by 1 in. thick. The packing rings are set out with eighteen elliptic steel springs, set screws, and jamb nuts made of composition metal. The springs are to be 1-32 in. narrower than the packing rings, and forged and finished to a uniform pattern, so that each spring may bear equally against the packing rings. The junk ring or follower is to be 1½ in. thick when finished, ground on to the piston head and packing rings, and secured with eighteen bolts 1½ in. in diameter, and chased in the lathe; the nuts being finished and countersunk in the follower. The piston head is cast with double shells, each shell 1½ in. thick, convex, with ribs connecting the two shells and center boss of piston rod, the boss being bored for the rod to a thickness of 4½ in. and a depth through the eye of 10 in. The flange of the head on which the

admission valves is 164 square inches, the lower valves being 10 in., and the upper valves 10½ in. in diameter. Each pair of exhaust valves has a combined area of 235 square inches, the upper valves being 12½ in., and the lower valves 12 in. in diameter. The valve stems are made of steel, and 1½ in. in diameter. The side pipes for the admission and exhaust are made with expansion joints, and the nozzles of the cylinder and valve chambers have an area equal to the area of their respective valves. The flanges of the valve chambers are finished 2 in. thick, and the flanges of the cylinder nozzles on which they are bolted are finished 2½ in. thick. The side pipes and chambers, both for the exhaust and admission of steam, will be 1½ in. thick. The valves are operated by two rock shafts and lifters, operating

[Continued on page 24.]

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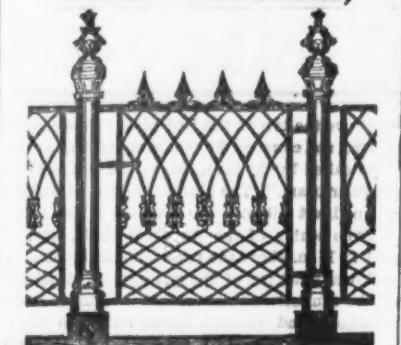
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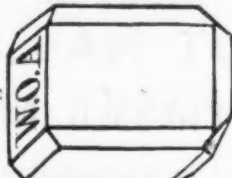


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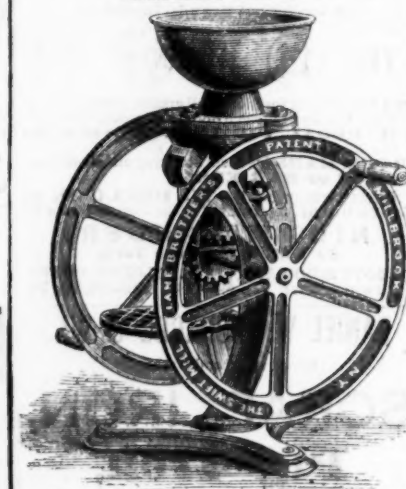
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Lead and its Preparation.

BY EDWARD J. HALLOCK, A. M.

Lead ores are found abundantly in all parts of the world, and not being difficult to work, we may suppose that lead was used at a very early date.

ORES OF LEAD.

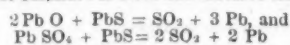
In nature lead occurs in many different forms; its compound with sulphur, known as *Galena*, is, however, the one generally employed for obtaining the metal. It contains, when pure, 86.6 per cent. of lead, the remaining 13.4 per cent. being sulphur. It is easily recognized by its lead gray color, metallic luster, and cubical crystals. Its specific gravity is about the same as iron, 7.2 to 7.7; and, with the exception of cinnabar, it is the heaviest of the ordinary minerals. In hardness it resembles rock salt, is scratched by a copper coin, but not scratched by the nail. *Galena* always contains more or less silver, the amount varying from 0.02 to 3 per cent.; the quantity must be determined by upellation, no external characters serving to distinguish the kinds that contain much, from those which contain but little. *Galena* is soluble in nitric acid, fuses on charcoal before the blowpipe, emitting sulphurous fumes and yielding a globule of metallic lead.

Clausthalite is a compound of lead with selenium, similar to the above, but much rarer, being found only in the Harz, and in Saxony, Germany, and a few places in Spain and South America. *Cerussite*, or native carbonate of lead, is a valuable ore found in Massachusetts, Pennsylvania, Virginia and many Northwestern States. It contains about 77.5 per cent. metallic lead, and has a white, gray, or grayish-black color, with an adamantine lustre inclining to resinous and sometimes pearly. The remaining ores of lead possess little value in the arts. Some, however, are remarkable for beauty of colors and crystalline form. *Crocoite*, or native chromate of lead, has a bright hyacinth red color, with adamantine, vitreous lustre, is always found in prismatic crystals, which are very brittle. It is easily dissolved in acids, and in hydrochloric acid gives a green solution and crystallized needles of chloride of lead. With a salt of phosphorus it gives an emerald green bead in both flames of the blow pipe. *Anglesite* is a native sulphate of lead having a white color, and is found either in prismatic crystals or lamellar masses. *Pyromorphite*, or native phosphate of lead, occurs in beautifully colored green, yellow and brown crystals, in the Perkiomen lead mine, near Philadelphia, and at Phoenixville; also in New York, a mile south of Sing Sing; in Davison county, N. C., and a few other localities. Lead is also found in combination with oxygen as minium, with arsenic acid as mimetite, with tungstic acid as stobite, and with molybdic acid as wulfenite.

REDUCTION FROM THE ORE.

There are several different methods employed for reducing the ores of lead, in some of which a reverberatory furnace is made use of, while in others some modification of the blast furnace comes in play; but, generally, lead made in a blast furnace is hard and poor; but the latter must always be employed if the ores are very refractory.

When a reverberatory furnace is employed, the bed is about 8 ft. by 10, formed of old slags, and well depressed at one side of the center, and at the lowest part is a tap hole for running off the metal. A ton of ore is operated upon at once. It is usually mixed with 1-30 of lime, unless the ore itself contains enough earthy matters to flux well together. After calcining the ore for about two hours rich slags or skimmings of former workings are thrown in. The charge is turned and rabbled to bring it into contact with the air, whereby portions of the sulphide of lead are converted into sulphate and oxide. These two compounds seem to be capable of reacting upon fresh portions of *galena* in such a manner as to produce sulphurous acids and metallic lead.



In order to effect the latter part of the operation, the damper is raised and furnace closed so as to raise the temperature to bright redness.

At this time effervescence takes place from the evolution of sulphurous acid, and the lead flows down into the depression in the bed, while quick lime is added to prevent a too ready fusion of the charge, a pasty state permitting the constituents to react upon each other more perfectly. If any silicate of lead is present that is also decomposed by the lime. Finally the heat is raised, and in three-quarters of an hour the metal subsiding in the lead is run out into the receiving pot and covered with small coal, which is afterward stirred with it, then skimmed off and put into the next charge as above described. In some places, as in Cornwall, the calcination and reduction of the ore are carried on by two distinct operations and in separate reverberatory furnaces.

When the ore is very pure it may be worked on what is called the ore-hearth, much purer lead being produced in this way than in the reverberatory furnace. In its simplest form, as formerly used in Missouri, it consisted of a square furnace built of logs or stones, to which the air was admitted through an arch in the fore side, the lead being collected in a basin in front. A more improved form, known as the American hearth, is sometimes made of cast iron, and so arranged that a hollow case surrounds the hearth, and through this the air passes on its way to the tuyere, so that the blast is raised to a high temperature. It would be impossible in the limits of the present article to describe all the various forms of hearths employed in different parts of the world, and also the methods employed for disposing of the fumes, such as flues from one to three miles in length, as are sometimes used in Scotland.

Impure ores, especially those containing other sulphides than lead, which, when reduced,

would seriously injure the latter, as well as those contaminated by silicates, require to be reduced in the cupola or blast furnace. One form of blast furnace, known as the Silesian furnace, consists of an upright chimney, square at first, but cylindrical above, having the same diameter throughout, built of common bricks and lined with fire bricks. The charge consists of *galena* in small pieces 100 parts, cast iron 12 parts and slag from iron forge 14 parts. Each ton of this charge requires a ton of fuel which is thrown against the front, and the ore, &c., against the back of the furnace, the tuyere being so arranged as to act only on the fuel without oxidizing the charge. In the Hartz a furnace of somewhat different form is employed. It is formed by two cones joined at their bases, is about 20 ft. high and 3 ft. in diameter at the widest part. The mouth terminates in a set of chambers, built so as to retard the current from the furnace and retain the volatilized lead fume from the charge. The Castilian furnace is used for very refractory ores, or difficult reducible slags. It is a circular cupola furnace, about 8 ft. in height up to where the charge is put in, and is 2 1/4 ft. in diameter, with water tuyeres at the sides and back. The material for reduction may contain about 80 per cent. of lead, and may be a mixture of ores and slag, which are reduced together. If a flux is needed for the ore, limestone is used. The charge is put in with alternate layers of fuel, as in the iron furnace.

Blast furnace lead, as we have above remarked, is hard, the hardness being due principally to the presence of sulphur, antimony and arsenic. These impurities diminish its ductility and malleability; but such lead will offer greater resistance to compression. A small quantity of oxide of lead, mechanically mixed, increases its tensile strength, but oxidation must be avoided when ductility is required. The softening is performed in a reverberatory furnace with very low dome, broad bridge, and level bed. Considerable heat is used at first, and, as it cools, a thick pellicle of slag, containing the impurities, forms and is raked off, the heat again raised, the slag again forms on cooling, and is raked off, and the operation repeated as often as may be necessary to purify the lead, the whole operation lasting from 24 hours to 14 days.

DESILVERIZATION.

Galena, we have seen, always contains more or less silver, the process employed for extracting which will depend on the amount present. Mr. Pattinson made the important discovery that when lead containing any notable amount of silver is fused, and they slowly cooled, being all the while thoroughly stirred, crystals will form and settle, which are less rich in silver than the metal was originally. His method of concentrating the silver is based on this fact, and conducted as follows: A series of 9 or 10 hemispherical iron pots, 5 ft. in diameter, and capable of holding 9 tons of metal each, are set in brick furnaces adjacent to each other, but with separate flues, furnaces, dampers, &c. The pigs of lead are placed in one of the pots near the middle of the range, and melted. The dross on the surface is skimmed off, the fire drawn, and the cooling lead constantly stirred until the crystals make their appearance. These are dipped out with a large perforated mangle, and, after draining, transferred to the next kettle on the right. This operation is continued until the necessary quantity of lead (about three tons) has been crystallized out, when the liquid portion, now twice as rich as before in silver, is ladled into the adjoining kettle on the left. The same operation is repeated with all the intermediate pots, the rich lead travelling to the left, the poor to the right, until at length the quantity of silver in the market pot, at the extreme right, is reduced, in some cases, to one-eighth of the original amount. The last pot on the left contains lead rich enough in silver to pay for expelling it, the loss of lead in expelling being about 5 per cent.

Another process for desilverizing lead, which was patented by Mr. Parkes, consists in fusing lead and zinc together, liquating the alloy of lead and zinc, then distilling the zinc and expelling the lead for silver. This process depends on the fact that lead and zinc do not permanently alloy, but on separating the zinc takes with it a small quantity of lead containing nearly all the silver.

The noble metals, when heated to fusion and exposed to a current of air, will not oxidize; but any alloy of base metals present will be perfectly oxidized. On this principle, the silver is obtained from the rich lead, the lead being oxidized in a cupel furnace and converted into litharge, which is afterward reduced again to metallic lead.

PROPERTIES OF METALLIC LEAD.

Pure lead is very soft, of a bluish white color, which tarnishes readily in consequence of the formation of a thin crust of suboxide. It has a specific gravity of 11.44, according to Berzelius, and melts at 326° to 335° C. (635° F.) It is malleable and ductile, but wanting in tenacity; a wire 1-12 inch in diameter does not support 30 lbs. It is not acted upon by dry air or pure water, but is rapidly corroded by the combined action of air and pure water. The corrosion is increased by the presence of chlorides and nitrates, but diminished by sulphates, phosphates, and carbonates; acid carbonate of lime, which generally occurs in spring waters, is remarkable for its preservative influence. Carbonic acid waters are very dangerous, as they dissolve the carbonate of lead.

Nitric acid and acetic acid act easily on lead. Sulphuric and hydrochloric acids have little or no action upon it, but *aqua regia* converts it into a chloride. Oil of turpentine also corrodes sheet lead with such energy that lead tanks cannot be employed for storing this substance. The uses of lead in the arts are too numerous and well known to permit of enumeration here.

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certain patents lately issued, which will be
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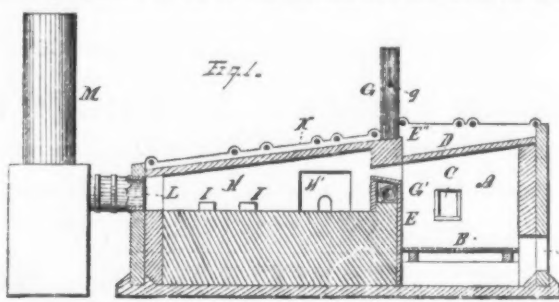
PUDDLING IRON AND STEEL.

Specification forming part of Letters Patent

No. 150,122, dated April 28, 1874, issued to
John M. Ayer, of Chicago, Ill.

Figure 1 represents a longitudinal section of
invention, and Fig. 2 a cross section of the
same.

The invention consists in the various parts
and combinations as hereinafter specified and
claimed, wherein A is a chamber provided with a
suitable grating, B, and ventilating opening
B', which may be made adjustable, so as to
govern the amount of draft admitted to the
furnace. C is a door, through which the fur-
nace is supplied with fuel. D is the roof of
the chamber A, and it is made to incline at a
proper angle downward toward the chimney
or stack M. E is a wall or partition, commonly
known as the "fire wall," standing between the
chambers A and H. The upper or free portion
of the fire wall E is provided with the open flue,
or "secondary combustion chamber," G,
which forms the upper portion of the fire wall



IMPROVED HEATING FURNACE.

E, and is made continuous at each end with
the secondary combustion flues G G, which
open outside the furnace, after passing a suit-
able distance through the same. The flues
G G are provided with the regulating dampers
g g. The upper face of the secondary com-
bustion chamber G', which forms the upper
portion of the fire wall, as aforesaid, is made
at a bevel or angle substantially opposite to
that of the roofs D K and the lower free por-
tion of the upper fire wall E'. H is the heating
or puddling chamber, provided with a roof, K,
inclined at an angle parallel to that of the roof
D of the fire chamber A. The chamber H is
provided also with a door or opening, H',
through which the chamber H is supplied with
piles, metal or anything intended to be heated,
and through which said chamber H may be in-
spected. I represents piles or other articles to
be heated or charged. L is the exit flue, com-
monly called the "velvet flue," of the chamber
H.

The chamber A is placed at the rear of and
below the floor of the chamber H, the difference
in height between the floors of the chambers A
and H being substantially equal to the height of
the fire wall E.

The various parts specified may be con-
structed of any suitable material possessing
sufficient strength and capability of resisting
high degrees of heat.

Fuel is placed upon the grating B in the
chamber A, where the first combustion takes
place. This combustion is, however, neces-
sarily imperfect and incomplete. The heat,
rising, and carrying with it the uncombusted
matter, is so acted upon by the inclined roof
D that a direct and undue draft from the chim-
ney M will be counteracted, and this modified
draft will conduct the heat and unburnt matter
up and over the fire wall E, and secondary com-
bustion chamber or perforated flue G' upon the
upper portion thereof. At this point—i. e., the
perforated combustion flue G—the combustion

rear of and below the floor of the bed of the
chamber H, in combination with the fire wall
E, provided with the secondary combustion
chamber G'.

2. The combustion flue or chamber G.

3. The combination of the perforated com-
bustion flue G and the flues G G.

4. The combination of the furnace H and
flues G G, exposed partly to the action of the
said furnace.

5. The combustion flue G, provided with the
beveled or angular top.

6. In combination with the beveled fire wall
E, the upper fire wall E', said wall E' extend-
ing its angle to a point opposite and above the
higher angle of the wall E.

7. The combination of the fire wall E, beveled
combustion chamber G', flues G G, and beveled
upper fire wall E'.

8. The flues G G, provided with the dampers
g g, in combination with the combustion
flue G'.

9. The combination of the chamber A, grate
B, inclined roof D, fire wall E, combustion
chamber G', flues G G, upper beveled fire wall
E', and chamber H, provided with the angular
or inclined roof K.

The following patents were lately issued for
inventions of interest to our readers:

REFLECTING LANTERN OR LAMP CAP.

To Thomas H. Braisted, New York.—The cap
of the lantern or lamp has attached to it, and
removable with it, a reflector consisting of a
central pendant, a perforated horizontal flange,
and an outer angular plate inclined to reflect
light downward.

REFRIGERATOR.

To Michael H. Hall, Portland, Me.—The fan-
blower when placed within
the wall of the refrigerator
exhausts any warm air
that may be admitted
when the safe is opened,
causing the air which en-
ters to pass over or
through the ice chamber.

KNIFE SCOUTER.

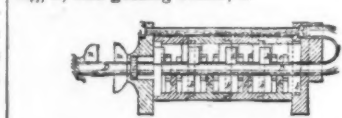
To William R. Hanks, Welles-
ley, Mass.—Claim.—The im-
proved knife scouter composed
of the socketed base D and sock-
eted cap C, connection screw-
rods E E, and two abrasive
cylinders, A B.

BIT STOCK.

To Hubert C. Hart, Unionville,
Conn.—The clamping-jaws are
operated by an end screw work-
ing in the nut in which they are
hinged.

COMBINATION PADLOCK.

To William F. Rutter, Philadel-
phia, Pa.—Claim. 1. The revol-
ving rings or tumblers A, held to-
gether by means of heads B B
and rods C C' in combination with the sliding
and rotating hasp or bolt D, having a hook, I,
lug, k, and guiding collar, a.



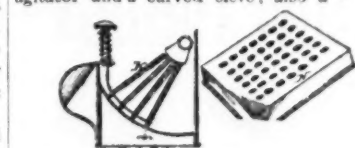
2. The lug m on the head B, in combination
with the sliding and rotating hasp or bolt D,
having a knob, h, and lug, n, for limiting the
rotary movement of the hasp or bolt.

CAN OPENER.

To George C. Spangler, Allegheny,
Pa.—The angular end of the shank
rests upon the tin to be cut, and has
projecting from its lower side, at the
oblique angle, a cutting blade.

COMBINED SCOOP AND SIFTER.

To Joseph Baker, Rochester, N. Y.—
In the scoop is inserted a detachable
agitator and a curved sieve; also a



perforated and a detachable bottom.

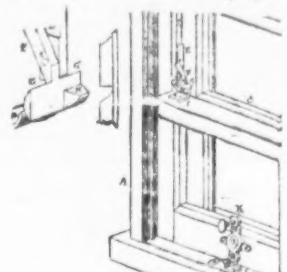
LOCK FOR DOORS, ETC.

To Ambrose J. B. Ber-
ger, Easton, Pa.—The
tumblers B and B', bent
lever F, guard G and
stop H, with the spring
g, stop H, and pin n,
arranged so that the
outside key hole can be
covered independently
of any other action of
the lock.

SASH FASTENER.

To Anthony Lake, Lancaster, Pa.—The lower
sash of the window is provided with a com-
bined latch and lifter, locking, upon the inside,
into a slotted catch plate on the window sill.
On the parting strip, near the edge of the
upper sash, is attached a locking device con-
sisting of a pivoted lever with a projecting foot

plate. The lever is automatically operated on



its pivot by the joint action of a peculiar plate
on the top of the inner meeting rail, and by the
lower sash itself when moved upward, the con-
struction and combination being such that
when the lever sash is locked down the auto-
matic action of the upper locking lever and
plate rigidly secures the upper sash at any de-
sired height for ventilating purposes, while it
cannot be pushed further down by outside in-
terference.

NUT LOCK.

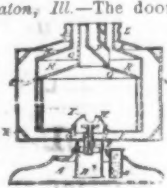
To Joseph Ellenberger, Easton, Ohio.—The
narrow strip of metal is bent to a right angle
at its ends, and is screwed on to each of the
two outer bolts, outside the nuts, so that they



stand in a vertical position. The locking bar
is then placed on the upper edge of the nuts
and under the bent ends of these strips. Said
bar is bent down at one end, and secured at
the other by a split pin.

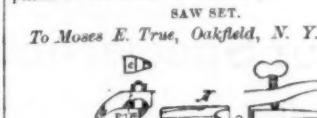
LANTERN.

To Rufus Nutting, Wheaton, Ill.—The doors
are hinged to the ver-
tical uprights, which
serve as air conductors.
Regulators of wire gauze
or hinged plates sur-
mount the glass panels,
which are secured by V
shaped guides. Fresh
air is supplied through the lower gauze inducts,
and being heated, passes through the dome and
returns through main uprights and horizontal
passage between flame and oil fountain. A cold
air conductor is located within the hot air
channels in the dome.



SASH HOLDER.

To Elias Stouffer, Macon, Ill.—The corrugated
faced cam is pivoted on a sliding
pin, which is hinged to a
flat metal plate fitted on the
lower meeting rail. This plate
has a slot in which the cam drops
when the pin is slid forward.
Its front edge or corner enters
the slot, while its roughened
face engages and holds the outer
sash. The hold is released by
raising the cam out of the slot and sliding the
pin to the other end of the plate.



SAW SET.

To Moses E. True, Oakfield, N. Y.—The im-



provement on Letters Patent consists in making
the rest c adjustable and reversible, and in pro-
viding same with shoulders adapted to set the
teeth of different saws.

CUTLERY HANDLE.

To George A. Seaver, New York, N. Y., and
John C. Milligan, South Orange, N. J.—The
handle is made up of the flattened tang of the

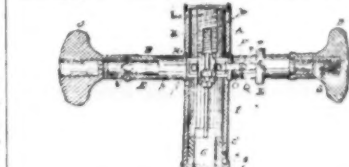


blade and two concavo-convex sides of thin
metal, which are secured to each other, and to
the tang by the edges of one being bent over
the edges of the other, and of the tang.

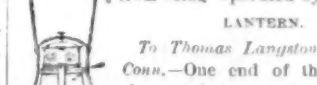
FASTENER FOR MEETING RAILS OF SASHES.

To Samuel G. Blackman, New Haven, Conn.—
Claim.—The herein
described sash fast-
ener, consisting of the
base A, with its verti-
cal flange C, through
which openings F are
made; the lever B
pivoted thereto, the
spring d in rear of lever, and the said lever con-
structed with a curved arm, E, upon each side
forward of the pivot, combined with the keeper
G I, constructed with openings L, correspond-
ing to the openings F in the other part.

LOCKING KNOB LATCH.
To Perley Loflin, Warren, Mass.—The tubu-
lar knob spindle is provided with a sliding rod
having projecting teeth, which engage with a
rack ring for the purpose of operating a latch



bolt. This sliding rod is operated by
means of a slotted sleeve, so as to throw
the teeth out of contact with the rack
ring, and thus prevent the bolt
from being operated by the knob.



LANTERN.

To Thomas Langston, Meriden,
Conn.—One end of the guard is
clamped between the globe and
cap, or between the globe and base,
the other end of the guard being
free.

Iron.

CLEVELAND.

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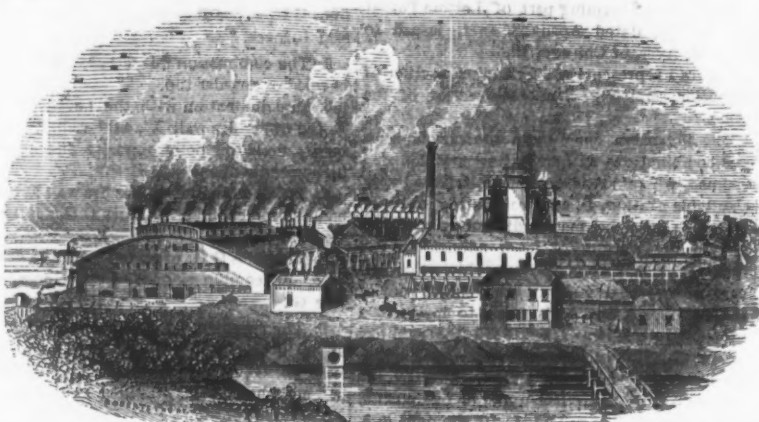
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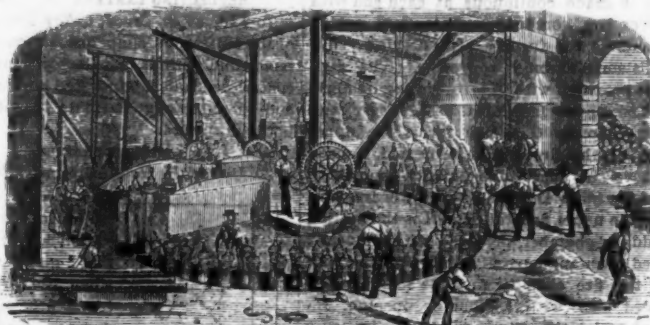
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WILLIAM F. DUFFEE, General Superintendent.

MILWAUKEE, WIS.

JOHN McNEAL & SONS,

BURLINGTON, N. J.

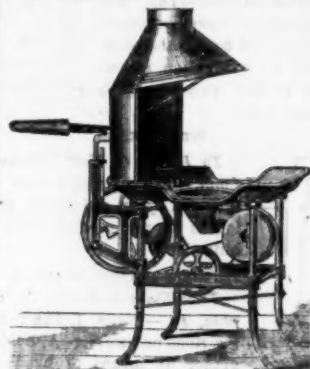


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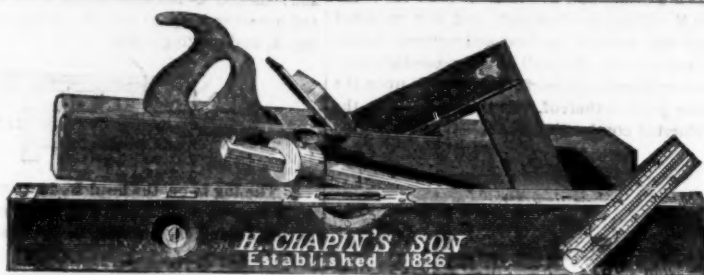
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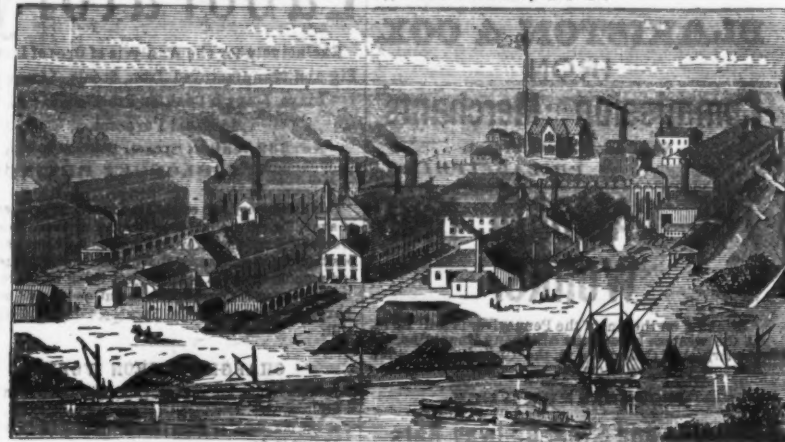
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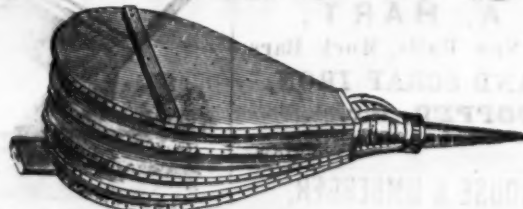
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See wholesale price current in

this paper.

**The Minerals of Muskingum Co., Ohio.**

From an interesting pamphlet published by the Board of Trade of Zanesville, Ohio, we take the following relative to the mineral resources of Muskingum county, of which it is the capital city:

COAL.

Muskingum county is situated on the western margin of the great Allegheny coal field, and consequently borders the vast coalless district which extends over two-thirds of Ohio, and all of the State of Indiana, except its western and southwestern border. Northern Illinois, Wisconsin, Michigan and Western Canada, are also largely dependent for coal which must be obtained from this and adjoining counties. This coalless district contains already many large cities, such as Cleveland, Toledo, Detroit, Chicago, Indianapolis, Dayton, Columbus and Cincinnati, and numerous smaller ones, all rapidly growing, and dependent in a great measure for their supplies of coal from this and other counties in its immediate vicinity. The central position of Muskingum county in this coal region, and the advantages it possesses in the way of railroad transportation, must enable it in due time to command the market of a very wide range of country.

There is not a township in Muskingum county in which workable coal beds are not found. Within the county are seven distinct coal strata, varying from three to seven feet in thickness, beside ten or twelve additional seams, a portion of which are also workable, but generally are so thin as to be, at this time, of little economical value, making an average aggregate thickness of over forty feet of available coal seams. The report of the State geologist on the geology of Muskingum county says, that "within the limits of this county there is found, in thicker or thinner developments, a representative of nearly every important coal seam in the coal measures of South-eastern Ohio." While the coal area of Muskingum county is, therefore, greater than that of any other county in the State, this coal, lying in accessible seams in the hill sides, is readily drained and easily and cheaply mined (shafting will for long years be here unknown), and constitutes nearly every variety employed in the numerous and economical purposes of life. As indicating the quantity and extent of the coal measures here existing, the following extract from the report of the State Geologist, J. W. Foster, author of "Pre-Historic Races of North America," may be pertinent in this connection. (See Geological Report of Ohio, 1837, page 87.) He says: "Here, then, is fossil fuel embraced in one county sufficient to supply the people for ages. Should the consumption of coal become proportionately as great as in England, there is sufficient in this county alone to supply the population of our State with fuel for two hundred and fifty years."

Prof. Mather, President of the first State Geological Board of Ohio, in his report to the General Assembly in 1837, speaking of the coal formations of this section of Ohio, says:

"Along a section from the base of the series at Brownsville, fourteen miles west of Zanesville, to Marietta, at the mouth of the Muskingum, in a thickness of 800 feet, are eight workable seams of coal." He also says, in another place in the same report: "The number of workable beds of coal in the coal fields of Ohio are found to be greater than in Pennsylvania or Virginia, and in the same vertical thickness much greater than in the coal fields of England."

Many of the varieties of the Muskingum county coal are of a superior quality, but some only permits a very brief note on this subject. The State geologist in the report of the coals of this county first above quoted (see Vol. I, Geological Survey of Ohio, 1873), says: "There appears to be almost every possible gradation between the dryest or non-coking coals and those which soften and swell in burning, and are in the highest degree coking in quality."

The coal from the seam known as the three and one-half foot vein has been used in the manufacture of coke to a considerable extent, producing an article strong and solid, adapted to the manufacture of iron and the various other purposes for which coke is employed. As a gas making coal it is considered superior, and but for the fact it contains a small quantity of sulphide of iron (which, however, on account of its weight is easily washed out), would stand at the head of gas making coals. This may be seen from the following analysis of samples of this coal taken through the entire seam, and which analysis is about an average of this entire coal vein:

	Lower 2 feet of seam.	Lower 16 inches.
Water.....	5.60	5.20
Fixed Carbon.....	83.05	81.80
Volatile Matter.....	37.90	37.80
Drab Ash.....	2.55	5.20
Sulphur.....	.76	1.75

There is also a seam of dry burning coal, as it is called, non-coking, above this three and one-half foot vein, the thickness of the seam varying from three to seven feet, and covering almost the entire eastern section of the county. Its greatest thickness is in the immediate vicinity of Zanesville. This coal, for the most part, is of a quality enabling it to be used for smelting purposes, but its character can best be judged from the following analysis of several samples, all taken from different openings:

	6.15	6.55	5.80	6.23	6.28
Ash.....	4.11	4.30	4.60	4.35	3.82
Volatile Matter.....	30.97	31.66	31.00	30.25	30.52
Fixed Carbon.....	58.47	58.59	58.60	59.16	59.38
Sulphur.....	.41	.58	.35	.28	.37

The varieties of coal here found are, for the most part, the bituminous and the cannel coal. The former largely predominates, though there are considerable veins of the latter, the thickest being near three feet.

IRON ORE.

By an inspection of the geological map of Muskingum county, accompanying the first volume of the Geological Survey of Ohio, 1873,

it will be seen that there is hardly a hill in the southern half of the county that does not contain iron ore, and in very many instances this ore is found in workable seams. But the most valuable ore beds, both in extent and quality, are in the northern and northeastern portions of the county, and which are not represented on the map from the fact that the seams have not yet been traced by the member of the geological board having this section of the county in charge. Consequently there is no recent estimate of the extent of the ore beds of this section of the county, and the quality of the ores is undetermined. Should the analysis when made demonstrate the ores of this section of the county to be equal in quality to those of the Southern section, these ores must become, at no distant day, a source of great revenue to Muskingum county, as they can be delivered at the Zanesville furnace as cheaply as stone. Foster, quoted above, in speaking of the ore of this county, says: "The ore beds embracing the western townships of Muskingum, and the eastern townships of Licking county, occupy an area equal to two hundred square miles." He, also, in the same report, estimates the quantity of iron ore in Muskingum county, and says: "The ores are rich, yielding probably from 30 to 60 per cent. of iron, and easily wrought, and number 153,000,000 square yards, and that each yard is capable of producing one ton of pig metal." The geological Report of 1873 says: "Ores of excellent quality are much more abundant in this county than was formerly supposed."

The analysis of these ores, as made by the present State chemist, ranges from 32 to 52½ per cent. metallic iron.

The following is the analysis of a number of samples of ore furnished him by the State geologist, selected from different neighborhoods in the county:

	Metallic Iron.	Phosphoric Acid.	Sulphur.
Hopewell township.....	37.07	Trace	Trace
Falls township.....	52.51	38	Trace
Zanesville corpora- tion.....	41.33	34	Trace
.....	35.44	3.50	.17
Zanesville corpora- tion.....	31.15	31	.50
Springfield township.....	47.15	29	Trace

Prof. Andrews, before quoted, in an article contained in the report of the Commissioner of Statistics of Ohio for 1871, in speaking generally of the iron ores of the eastern district of Ohio, including Muskingum county, says: "The ores of the district are generally of great excellence and purity, and the iron made from them has a very high reputation." These ores have as yet been mined only to a very limited extent.

LIMESTONE.

The limestone of Muskingum county exceeds computation. There are here found twenty-two distinct and separate seams, and it is seen cropping out in almost every hill in the county. The color varies from a light gray to a deep blue. It is sub-crystalline in texture, and is found in strata varying from a few inches to five or six feet in thickness, some of the strata being separated from each other by a very thin layer of clay, or other mineral deposit. The blue limestone is, to a considerable extent, fossiliferous, but very durable, almost as much so as granite, admits of a high polish, and as a flux in the manufacture of iron, is highly approved. As a "gas lime" it is superior, as the following analysis demonstrates:

Carbonate of lime.....	94.34
magnesia.....	2.96
Silica and sand.....	2.70
Alumina and iron.....	1.60
	100.00

The gray limestone everywhere abounds along the creeks and smaller streams, the hill sides and on the most elevated lands. Prof. Andrews says: "The limestone in the bed of Jonathan's Creek is the representative in the State of the lower carboniferous limestone of Illinois and Missouri, and is a deposit of very great scientific interest." It is also susceptible of a high polish, and has been used in the construction of jambs, pillars, and other ornamental work. For purity, beauty and durability, these varieties of limestone have not their superior in the State, and in addition to their use in the arts, and conversion into lime and employment for building purposes, they have been sought for various purposes on account of the high finish of which they admit.

BUILDING STONE.

The hills of Muskingum county are filled with building stone of almost every variety and quality. The free and sand stones are durable and harden with age, as can be seen in numerous private and public structures in and about Zanesville. They are now coming into demand for the construction of public edifices. They are found imbedded in the river hills and along the lines of railroad, and are easily and cheaply quarried. A very superior building stone is found in the southwestern section of the county, which has much the appearance of the celebrated "Waverly sand stone," and when polished is almost equally as beautiful. There are also in the immediate vicinity of Zanesville, and in various neighborhoods throughout the county, quarries of flag stone of fine grain, beautiful appearance, of superior quality and adjusted, by the touch of the hammer, into almost any required form. These flags are very durable, the sand is fine, and mica is so disposed in horizontal plates that it fractures in smooth, flat surfaces. There is also stone in different neighborhoods suitable for the manufacture of glass, and used extensively by the Zanesville glass manufacturers. Builders' and molding sand is abundant, sufficient to meet any demand, in all parts of the county.

BURR.

What is called "Burr Stone" is found in the western section of the county. It exists on both sides of the line dividing Muskingum and Licking counties, and extends into the north-east corner of Perry county. The stone is of a grayish or yellowish white, sometimes passing into hornstone, exists in beds from two to six

feet in thickness, is fine grained and compact, and well calculated to give a fine edge to cutting tools or implements. The Indians used the compact hornstone for arrow heads. This Burr was, years ago, quarried to quite an extent, and made into mill stones, but as the material lacked tenacity they were not regarded with equal favor with the "French Burr." Their manufacture has of late been abandoned, and at present this Burr is not sought.

POTTERS' CLAY, GYPSUM AND KAOLIN.

Potters' clay is found in many sections of the county. It exists in seams varying from a few inches to twelve and fourteen feet in thickness, and in quantities sufficient to be successfully employed in the manufacture of pottery ware. The conversion of this clay into ware has, for many years, been an important industry of this county, and a source of large revenue to those engaged in its production. A bed of gypsum has also recently been discovered about six miles west of Zanesville, but its extent has not yet been determined. It is not quite white, but has the appearance of being a good article, and is the only mineral of the kind yet discovered in the Muskingum Valley. A twelve foot seam of kaolin has also recently been discovered in the eastern section of the county, the clay being of the same composition from top to bottom of the seam. The following analysis shows its character:

Silica.....	41.60
Alumina.....	34.30
lime.....	.30
Iron.....	.70
Alkalies.....	19.60
Water.....	

FIRE PROOF MATERIALS.

Large deposits of clay suitable for making fire brick are found in the immediate vicinity of Zanesville, and in other neighborhoods throughout the county. Glass stone is found in the northern portions of the county in the river hills, millions of tons of which can be quarried, and it exhibits, on comparison, no perceptible difference from the celebrated stone of England used in the manufacture of iron and steel, and which is considered the best fire proof material yet discovered. It is most refractory, and the analysis proves it very pure silica, containing a small per cent. of potash.

SALT AND PETROLEUM.

Borings for salt water have been made at various points along the Muskingum River in this county, and also on the Licking and Moxahala and Salt Creeks. In no instance has there been a failure to obtain salt water, though in some instances the water was deficient in strength or quantity, and unprofitable to evaporate. In all there have been about sixty salt wells sunk in this county, but only a small number of these are at this time in operation. The water is evaporated by the use of coal, and while some of the wells have produced as high as 7000 barrels per year, others have not produced half that amount. As a branch of industry, the salt business does not command that importance it did years ago. Should the demand for salt increase, the salt business revive, and its manufacture again bring remunerative prices, these salt wells could all be again put in operation at comparatively small cost.

Petroleum wells have also been bored in the southern part of the county, and petroleum in considerable quantities obtained. This oil, for lubricating purposes, has no superior, and commands a ready market, but the price for the last few years has been such as to discourage its production.

OTHER MINERALS.

Other minerals of less importance than those above named might be mentioned as here existing, but enough has been presented to indicate, in this particular, the resources of the county. There are other deposits of stone and clay than those enumerated above, but their value in the arts or otherwise remains to be tested. Many details might have been given, interesting to the general reader, but enough has been presented to demonstrate that this section is amply stored with all those minerals so necessary to the wants and conveniences of mankind, and which must, at no distant day, prove not merely a permanent source of wealth to the community which may here be gathered, but to the State and country at large.

Coal Discoveries near Upper Sandusky, O.—A dispatch from Upper Sandusky, under date of June 14th, says: For the past two weeks parties have been engaged in quarrying stone on the old Frederick Fox farm, one half mile east of this place. Yesterday coal was discovered in small quantities among the stone, which created considerable excitement. To-day the quarry was visited by Prof. John Pausch, formerly a prominent coal miner of the East. He pronounces it genuine coal, and says that he has no doubt coal can be found in abundance. Further investigations will be made at once by our most prominent citizens.

On Tuesday last the steel works of Messrs. Reese, Graft & Woods, Pittsburgh, was damaged by fire to the extent of \$300.

Messrs. Burden, of Troy, have made some improvements in their blast furnace, which will increase its economy and efficiency. They have added a new hot blast oven, raised the stack 10 feet and provided it with a bell and hopper attachment.

The Canadian Steel Company have taken hold of the Londonderry iron mines of Nova Scotia, and are preparing to greatly extend their works.

A number of steam propellers, capable of carrying 1500 to 2000 tons, are to be built of steel by a party of English capitalists and put in the Mississippi Valley trade.

Eight acres of land at McKeesport have been purchased by a party of gentlemen of Pittsburgh, who will erect a blast furnace and a large steel works.

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All Nicholson Files are cut with the Patent Increment Cut, an invention owned and controlled exclusively by us, the file cut in this manner being Patented as a new article of manufacture, and differs from all other machine cut files (all of which have their teeth cut with equal spaces) by being cut with teeth slightly expanding or increasing in size and space from the point, thus avoiding the too great regularity of teeth common to all other machine cut files. The tendency of all cutting tools with teeth or cutters placed at regular distances from each other may be illustrated (to the machinist at east) by the fluted reamer—as it is well known that if a round reamer be made with (say 12) teeth whose spaces are equidistant, the hole reamed will not be round and smooth, but will approximate to a hexagon in shape. Whereas, if the same number of teeth be made of irregular distances, the hole reamed will be both round and smooth. The same is true of a file, hence the necessity of its having teeth at unequal distances, and to which we have applied the name of Increment Cut File, which possesses all the advantages of hand cut work, and the accuracy and uniformity of machine work. It is now upwards of seven years since this File was introduced to the public, and the demand has increased until our production is undoubtedly treble that of any File manufactory in the country.

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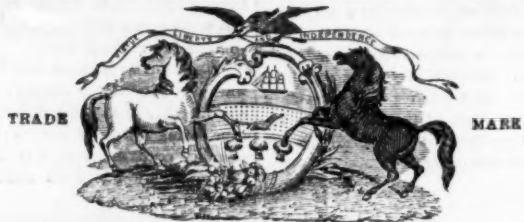
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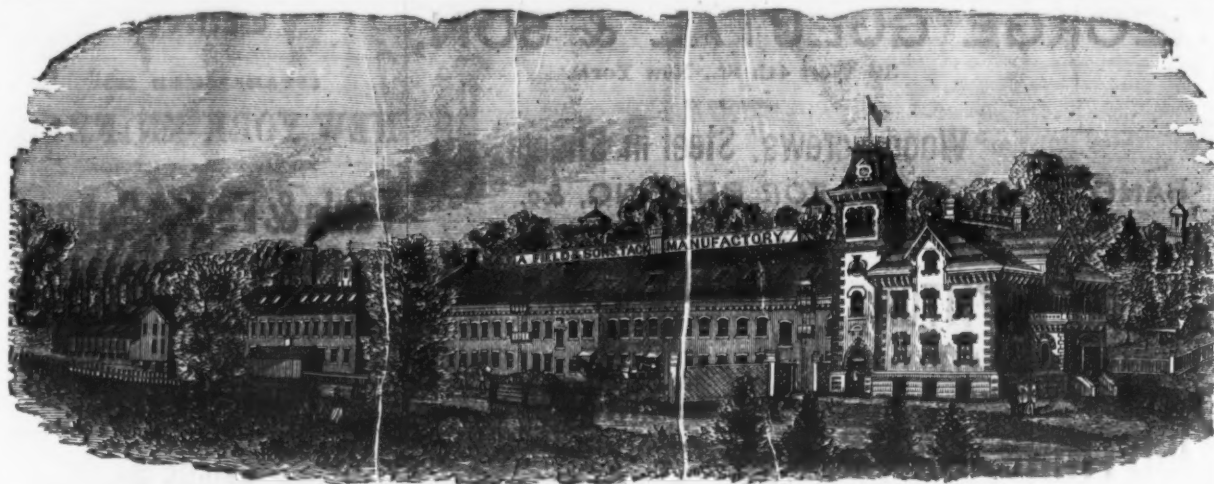
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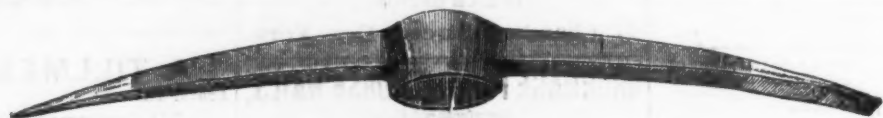
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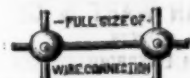
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BUSINESS ITEMS.

PENNSYLVANIA.

Brown & Co., of Pittsburgh, have received the contract for making the boiler iron for the water works at Cincinnati.

A co-operative iron company is to be organized at Pottsville, consisting of puddlers and other iron workers. They propose to either build works along the Berks county Railroad or lease the mill property of the Hauberg Iron Co., and operate that on the co-operative plan. About thirty practical men are interested in the movement.

The Lehigh Valley Iron Company, of Coplay, is filling an order for pig iron at \$42 a ton. The contract for this iron was made before the panic, which accounts for the exceptionally high price.

The rolling mill and nail works at Birdsboro', Berks county, have stopped for repairs.

It is rumored that the Glendon furnaces, Easton, will soon be blown out. These furnaces and their connecting quarries and mines give employment to 1000 men.

The rolling mill at Milton, is running on full time, with orders enough on hand to keep it going for several months.

The valuable coal property of the Benzinger Coal & Iron Company, near St. Mary's, Elk county, is to be sold on foreclosure of a mortgage at Philadelphia, July 7th.

Milton Furnace, Jackson, went into blast a few days ago.

The Robesonia Furnace, lately rebuilt by the firm of Welner & Birkinbine, has gone into blast, making 16 tons of iron the first day.

RHODE ISLAND.

The American Enamel Company, of Providence, was organized in 1866. Their factory is of brick, 100 feet long, two stories in height, with other buildings attached, covering in all about an acre of ground. They employ a large number of hands, and have deservedly won the reputation of producing some of the finest enameled and japanned work in the country. They hold several valuable patents; one is on their "Royal Enamel," which is claimed to be unsurpassed for durability, toughness and brilliancy of lustre; another patent is on their justly celebrated "Wrought Iron Enameled Water Pipe," of which they are the sole manufacturers. By the application of their "Patent Royal Enamel" to wrought iron tubes they produce by means of great heat a most perfect pipe for the conveyance of water, gas, &c. It has resisted the severest tests of acids of all kinds, heat and water, and scientific men who have examined it, we understand, say that as a water pipe it has no rival of equal merit, and the great care and pains taken by the company in the enameling of this one article, as well as in every department of their business, entitles them to the high reputation their pipe and general work has everywhere attained. Though the majority of their fancy work is finished in jet enamel, yet they finish a large amount in brown and imitation of fancy woods. Their patent fancy colors and imitation shell on wood work are truly beautiful. They enamel on metals, wood, cloth, leather or paper. The company is now under the efficient management of Mr. Chas. A. Gamwell, treasurer and secretary, and Mr. Benj. G. Johnson, superintendent.

OHIO.

Saws of all kinds are manufactured by James Ohlen, at Columbus, who has been established over twenty-one years. His list includes circular mill, muley, gang and cross-cut saws, his specialty being thin circular saws for sawing valuable hard woods. The sizes run up to six feet, nine gauge, and five feet, eleven and twelve gauge. His buildings are two stories, 250x40 feet, to which he has recently added one 40x40, for hardening, and one 50x15 for filing. The grinding machine is of peculiarly solid construction, built after Mr. Ohlen's design, and secures a very even thickness for the saws.

The Columbus Machine Company have recently occupied their new machine shop, which is one of the finest and most convenient, as to light and space, in the country. It is built of brick, with slate roof, is 323x50 feet, two stories high. The company are soon to erect a foundry, 70x90 feet, with two cupolas, 44x48. The office will be a handsome structure, 40x60, two stories, with a bell tower. The work of the company includes steam engines for blast furnaces, punching shears and trip hammers. They are now finishing a splendid engine for the Licking Iron Co., at Newark, to run a 15 ton furnace, having a 60 inch blowing cylinder, a 24 inch steam cylinder, and a 48 inch stroke. It weighs 47 tons.

MISSOURI.

The Bessemer Steel Manufacturing Company, at St. Louis, will, when completed, be a very extensive affair. The capital of the company is \$1,000,000. The works are located on the river bank, directly opposite Carondelet, and the property embraces 100 acres of land, with a frontage on the river of 1197 feet. There will be two blast furnaces, each 60 feet in height, 17 feet at bushes, and 13 feet tunnel head. The East St. Louis and Carondelet railroad runs through the property, also a narrow gauge road to Cairo and Big Muddy rivers. The works are expected to be in operation early in 1875, and will employ 250 hands.

It has been determined by the Southeastern Railroad Company not to rebuild their machine and repair shops at Mount Vernon, which were recently destroyed by fire. Belleville has been selected as the best point for these shops, and we congratulate that thrifty town upon its new acquisition of an important business.

In the matter of foundries and machine shops St. Louis eclipses every city in the West and Southwest. In the manufacture of the single article of stoves, she has a capital of \$1,500,000, making annually 115,000 stoves, and giving employment to 1500 hands. Her machine shops represent a capital of \$1,750,000, and give employment to 1300 hands.

KANSAS.

There has been \$45,000 expended by the Chicago Zinc Company, in the erection of works at Cherokee, on the line of the Missouri River, Fort Scott and Gulf Railroad.

INDIANA.

The Evansville rolling mill was sold at auction recently for \$60,300. It was bid in by a new company, composed of citizens of Evansville and iron men of Pittsburgh and Cincinnati.

KENTUCKY.

John T. Lewis & Co., proprietors of the Enterprise Iron Works, Covington, are building a nut machine which will weigh, when completed, nine tons, the largest in the country. The capacity of the machine will be from two and a half to three tons of nuts per day.

CALIFORNIA.

The San Francisco Copper Mining Company, operating near Spencerville, a few miles east of Wheatland, have new furnaces built, and commenced operations last Monday. They have put a new pulsometer pump into the mine, which works well and is capable of handling all the water in the mine.

NEBRASKA.

An agricultural implement factory is to be started at Grand Island.

MINNESOTA.

The Chamber of Commerce of St. Paul is organizing a stock company with a capital of \$250,000 to \$500,000, to encourage the establishment of important branches of manufacturing there, by loans of part of the capital required or by direct investment.

MASSACHUSETTS.

Among the older Lawrence industries is that of the Merrimack Iron Foundry, which makes a specialty of machinery castings, doing a large amount of work for the Lawrence mills. They occupy a building 200 by 70 feet, and operate two furnaces, having a capacity for melting about 6 tons of iron per day. Forty hands are employed, being the same number as before the panic, and they are working on full time. J. S. Bennett and Wm. H. Joselyn are the proprietors of this establishment.

The manufacture of the "Huntton Governor," formerly carried on in Boston, has been removed to Lawrence. The proprietors, E. Palmer, Boardman & Co., have fitted up their shop with new and improved machinery, and intend, if possible, to give their customers even better satisfaction than heretofore, both in the promptness of filling orders and in the quality of the work furnished, which is all guaranteed.

The Lawrence Boiler Works have rebuilt their shops, the main building being 40x80 feet, and are having a 15-horse engine put in, and setting a new boiler. The works will be running by July 1, with 15 hands, double their present force. They have a contract to build two bleaching tiers and a steam box for the Pacific mills.

CONNECTICUT.

The Meriden Britannia Ware Company are filling a large order for the very best pure nickel silver goods, for the Pacific Mail Steamship Company's line. The order calls for plates, goblets, pitchers, tankards, bowls, spoons, knives, forks etc., and the value of the goods furnished will amount to upward of \$250,000, there being 30 steamships to be supplied. All these goods are to be finished up in the very finest quality, hard solder being used.

Mr. C. Burgess, of Portsmouth, Ohio, claims that by a mixture of fine cast iron with soft gray cast iron he makes a new compound iron as specially suitable for chilled or ordinary castings. By the adaptation of an ordinary gas, puddling, closed or reverberatory furnace, and the employment of mineral coal therein, he produces a fine or partially refined cast iron for use in the foregoing process; and by a further continuation of or addition to the refining process, he claims to convert cast iron direct into steel, in a common puddling or other suitable furnace, rapidly, effectively, and economically.

The Pennsylvania Railroad is now running, between Pittsburgh and Philadelphia, the fastest train which is run so long a distance on any railroad in the country. It is the "Day Express," leaving Pittsburgh at 7:45 a. m., and arriving in Philadelphia at 6:40 p. m. There are two stops made, at which the engines are changed, at Altoona and Harrisburg, the former being five minutes, and the latter twenty minutes, so that the train actually runs this distance in ten hours and one-half, or an average of one mile in considerably less than two minutes. The three runs made without stoppages are respectively 117, 132, and 105 miles, each being quite a long continuous run.

It is announced in West Virginia, papers that a company with a capital of \$300,000 has been formed to manufacture nails from the raw material at Huntington, in that State. This is one of many evidences of the tendencies of capital toward the great mining centers of the Union, and especially in Virginia. During the last few years a great deal of mineral lands in the Virginias have been sold to foreign and New York capitalists, and broad foundations are laid for extensive industries.

The Cleveland (Eng.) iron stone mine proprietors announced to the strikers that they would enforce a greater reduction than 12½ per cent. If the miners did not return to work by the 9th inst. It was thought at the date of last advices that the men would not yield, and that the dispute must be disastrously prolonged. The London Times of the 5th inst. says: "It is estimated that between 2000 and 3000 miners have already left the district. The effect of the strike upon the trade is severely felt. Wholesale places of business are closing their account in the mining districts. There is also a marked effect upon the railway traffic."

DEMAREST, JOYCE & CO.,
Iron Founders,
MACHINISTS,
and Manufacturers of
Sewing Machines,
Steam Fittings,
AND
LIGHT WORK of all kinds.
ALSO
Plain and Ornamental
Japanning.
20 to 30 Morton, and 57 to 65
Clymer Streets,
BROOKLYN, E. D., N. Y.

EAGLE IRON FOUNDRY.
20 to 30 Morton, and 57 to 65
Clymer Streets,
BROOKLYN, E. D., N. Y.

H. W. PEACE,

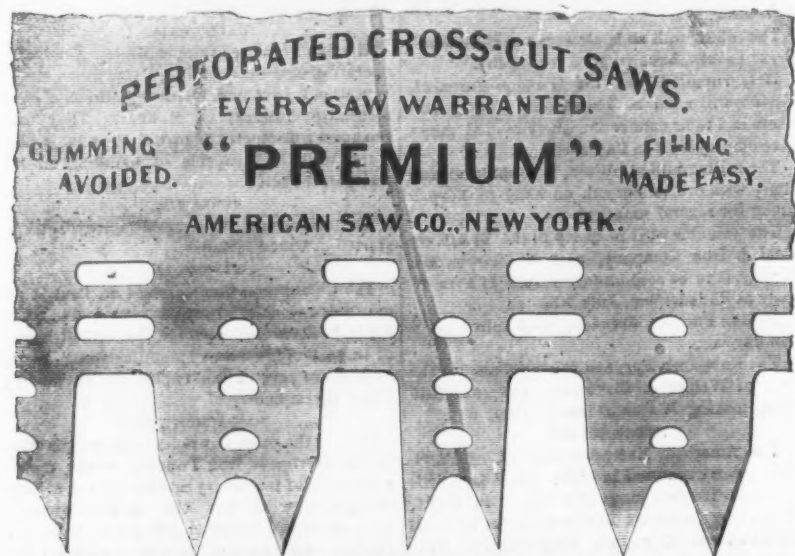
MANUFACTURER OF

SAWS OF ALL KINDS.

FACTORY, WILLIAMSBURGH, N. Y.

AMERICAN SAW CO.,

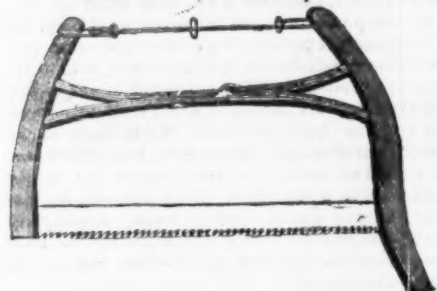
TRENTON, NEW JERSEY.



Solid saws require frequent gumming, thereby subjecting them to risk of springing or breaking. This is especially the case with cross cuts having Patent Teeth. In the perforated saws all gumming is avoided, and the teeth are easily kept long and in proper shape, saving files, labor, expense and vexation. As is well known, our saws cut faster, smoother and easier than any other.

MOVABLE-TOOTHED CIRCULAR SAWS AND SOLID SAWS OF ALL KINDS.

Hankins' Elliptic Forked Saw Frame.



Patented June 28th, 1870.

The annexed engraving represents HANKINS' ELLIPTIC FORKED SAW FRAME, which commends itself to the trade for its simplicity of construction. The Forked Frame being all in one piece, without any center bolt, secures for the Frame great strength and durability. These Frames are put up with my best Webs, marked "No. 40, Harvey W. Peace."

HARVEY W. PEACE,
VULCAN SAW WORKS,
WILLIAMSBURGH, N. Y.

J. FLINT & CO.

Manufacturers of all kinds of SAWS and PLASTERING TROWELS.

ROCHESTER, N. Y.

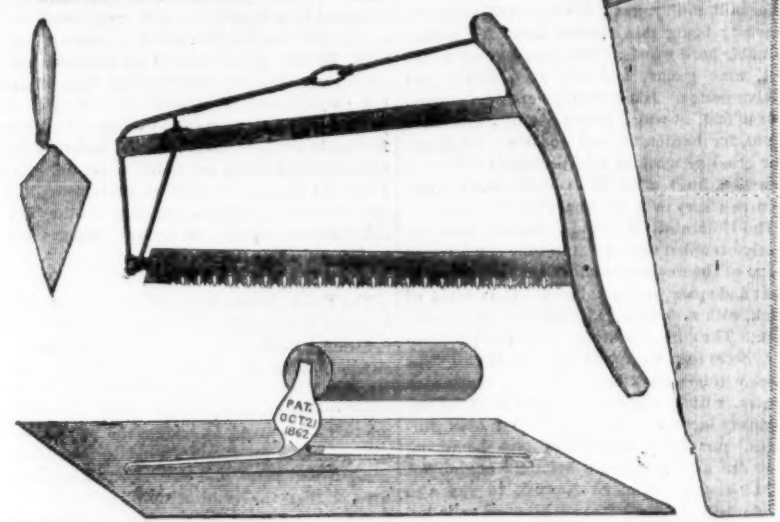
Dietrich's Patent Wood Saw. Guaranteed the strongest, lightest, easiest to strain or tighten and best braced wood saw made; also to give perfect satisfaction.

Dietrich's Patent Double Handle Rip Saw. All will readily see the benefit of this useful invention.

J. Flint's Patent Plastering Trowels. The best made and finished trowels in the world. We make four grades of Plastering Trowels, from the best to the cheapest.

Our patent method of grinding hand saws makes them superior to any in the market.

Send for Illustrated Price List.



YALE LOCK MFG. CO.

Office and Works at STAMFORD, CONN., Salesroom 298 Broadway, N. Y.

In addition to their line of Celebrated Locks, would particularly call the attention of the Hardware trade to their extensive manufacture of

ORNAMENTAL REAL BRONZE HARDWARE.

Illustrated Catalogues of which will be furnished on application.

These goods are equal to the best in the market, while their prices are very favorable.



GEORGE GUEUTAL & SON,

39 West 4th St., New York.

IMPORTER OF



Wood Screws, Steel in Sheets,

BAND SAWS, TOOLS FOR BRAZING, &c.

Bed Screws, Pin Hinges, and Wire Nails a Specialty.

E. M. BOYNTON,

80 Beekman St., N. Y.

Manufacturer of

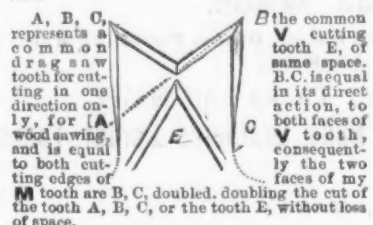
LIGHTNING SAWS.



A Challenge of \$500, toward expense of a public test, to prove that the Lightning Saws excel all others in Speed, Ease, and Simplicity, has been offered since 1870, and has never been accepted. More than 100,000 Lightning Saws were sold during the year 1872, the purchasers of which testify to their superior merits.

Our leading papers, such as the *Traveller*, *American Agriculturist*, *Christian Union*, etc., have published over sixty editorial notices recommending these Saws. Farmers' Clubs, Lumbermen, and Hardware Dealers unite in propounding the genuine Lightning Saw the greatest labor-saving implement of the age.

I have hundreds of letters from practical sawyers, voluntarily written, expressing their entire approval of these Saws.



This is produced by dressing the two points of my M tooth, to cut in line so that the outside B, C, has four times the space of the slant edge behind it, or from 1 to 5, while slant has space from 1 to 2, the inefficient slant edges are thus practically concealed and do but slight surface cutting, while B, C, edges cut and clear simultaneously.

For Catalogue and additional information address

E. M. BOYNTON, 80 Beekman Street, New York,

Sole Proprietor and Manufacturer.

N.Y. SawFrame Co.

E. M. BOYNTON,

80 Beekman Street, New York,

SOLE AGENT.



I make a specialty of the LARGEST SIZES of Circular Saws, and call particular attention of lumber manufacturers to the following points of excellence: Evenness of Temper.—The peculiar structure of my furnace subjects all parts of the saw to a DEAD heat, and when dipped in the oil bath secures perfect uniformity.

Perfect Accuracy in Thickness.—My saws are ground on a patent machine, automatic in its operation, grinding off the thick places upon the plate before the thinner parts are reached, and when the saw is removed BALANCES PERFECTLY, which is proof positive of the right accomplishment of the work.

Properly Hammered.—Great care is taken that no saw shall leave my works without due attention in this important particular. A saw too tightly strained upon the rim, or too loose in the center, cannot be successfully run—hence the importance of so hammering the saw as to effect equal strain in all its parts, and at the same time RUN TRUE. This department is under the personal supervision of myself, who has devoted over twenty years to the art of saw making.

I am sole proprietor and manufacturer of the celebrated "Challenge" Cross-Cut Saw. Price Lists of all kinds of saws sent on application.

JAMES OHLEN.



BUCK BROTHERS, MILLBURY, MASS.

The most complete assortment in the U. S. of Shank, Socket Firmer, and Socket Framing

CHISELS.

Gauges of all lengths, and circles beveled inside or outside. Nail Sets, Scraps, and Belt Awns, Chisel Handles of all kinds. Orders filled promptly, generally same day as received.



GREENFIELD TOOL CO.,

Sole Manufacturers of the Celebrated

"Diamond" PLANE IRONS,

of uniform temper and finish. Solid Steel Caps and Warranted. PATENT FORGED OR SHOE. The only shoe made with concavity to fit hoof, and the best and cheapest. BENT AND MOLDING PLANE of every description. Also, Row and Match Bit, Moulding and Rabbet Irons, Plane Stops, Cuts, Starters, Flaws, &c., &c. Drop Forging to order. Address for Catalogue and Prices GREENFIELD TOOL CO., Greenfield, Mass.

Warehouses: New York, 37 Chambers St.; Boston, 22 Oliver St. Reduced Prices for 1874.

WHEELER, MADDEN & CLEMON,

Manufacturers of Warranted Cast Steel

SAWS

of every description,

including

Circular, Shingle, Cross Cut,

Mill, Hand, Roberts' and

other Wood Saws,

&c., &c

Cast Steel Files

of the well known brand of

Wheeler, Madden & Clemson.

FACTORIES:

Middletown, Orange Co., N. Y.

BRANCH OFFICE:

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BRUNDAGE FORGED HORSE NAILS,

Manufactured from

BEST NORWAY IRON,

by BRUNDAGE & CO. Sold by

WHEELER, MADDEN & CLEMON

Middletown, Orange Co., N. Y.

E. C. ATKINS & CO.,

Indianapolis, Indiana,

Saw Manufacturers.

Best Cast Steel Patent Ground Saws

Also, sole Manufacturers of Atkins' Patent

CROSS-CUT SAW HANDLE.

Best Patent Handle in use.

Manufacture and Office—Nos. 210 212, 214 and

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WM. McNIECE, Excelsior Saw Works.

515 Cherry St., Philadelphia.

Manufacturer of

Extra Cast Steel Saws of every description.

Pat. Screw Socket Pole Pruning Saws,

Patent Screw Socket Edging Knives,

Patent Screw Socket Scuffle Hoes, and

Patent Screw Socket Paper Hang-

ers' Scrapers,

Mowing Machine Sections of all patterns

constantly on hand.

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Manufacturers of

Lead Kettles for Acids to Cleanse Wire, &c.

OFFICE AND WORKS,

75 to 81 S. Main St., Providence, R. I.

Cutlery.

ESTABLISHED 1852.

NEW YORK KNIFE CO.

MANUFACTURERS OF SUPERIOR

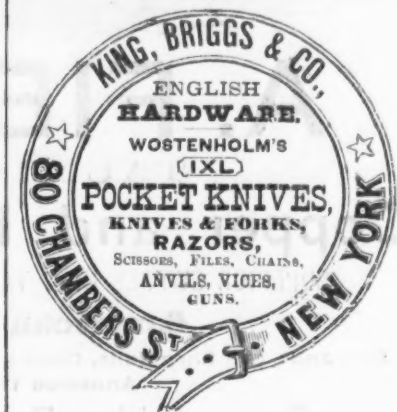
Table & Pocket Cutlery,

WARRANTED TO BE MADE OF THE BEST MATERIAL.

WALKILL RIVER WORKS,

Walden, Orange Co., New York.

THOS. J. BRADLEY, President.



Wood's Hot Water-Proof Table Cutlery.

Handsome, Cheapest, most Durable Cutlery in use.

Wood's Celebrated Shoe Knives. Butcher

Knives a specialty.

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Wholesale Cutlers.

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Knives, Razors,

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SPECIALTIES:

Full Concealed Razors,

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Russia Leather Razor Straps,

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At each of these places a complete assortment of sam-

ples of Hardware and Fancy Goods will be found, in-

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Manufactured by W. D. TURNER & CO. Geneva, France. Agents. For sale by CHAS. HAN & BROS. 59 Chambers St. N. Y. Manufacturer's Agent.

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Landers, Frary & Clark,
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MANUFACTURERS OF

TABLE CUTLERY
OF EVERY DESCRIPTION. ALSO.

General Hardware,
IN VERY GREAT VARIETY.

298 BROADWAY, N. Y.

PETERS BROTHERS,
AWARDED THE MEDAL OF MERIT. LARGE STOCK OF VIENNA, 1873.

American, German, English
Pen, Pocket & Combination Knives.
Scissors, Scissor Cases,
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Isaac Milner's Fine Pocket and Table Cutlery.
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"WATROUS" SHIP & CARPENTERS' AUGERS,
Adjustable Handled Drawing Knives, Axes, &c.
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Pen and Pocket Cutlery, Solid Steel Scissors, F. & L. Shears, Razors,
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Manufacturers of

PATENT FINE PEN & POCKET CUTLERY
WEST MERIDEN, CONN.

The only knives made that are put together in such a manner that there is no strain on the covering or frail part of the knife. We warrant our knives equal in cutting qualities and workmanship to any made, and are acknowledged by English makers as the **Best American Knife.** We also make
NICKEL & SILVER PLATED POCKET KNIVES
which will not rust or become discolored when used as a Fruit Knife, and their cutting qualities are equal to any other knife. Orders filled from the factory or by
J. CLARK WILSON & CO., 81 Beekman Street, N. Y.

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Joseph Rodgers & Sons' (LIMITED)
CELEBRATED CUTLERY,
No. 83 Chambers Street, New York.
CHARLES PEACE, Jr., Agent.

The demand for Joseph Rodgers & Sons' productions having considerably increased, they have, in order to meet it, greatly extended their Manufacturing Premises and Steam Power.
To distinguish Articles of Joseph Rodgers & Sons' Manufacture, please to see that they bear their Corporate Mark.

Notice of Removal.
ASLINE WARD,
From 54 Beekman St. to No. 101 and 103
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REPRESENTING
GEO. WOSTENHOLM & SON
CUTLERY AND RAZORS,
WASHINGTON WORKS, SHEFFIELD.
CORPORATE MARK.

IXL

FRED'K WARD & CO., SHEFFIELD,
CUTLERY & TABLE KNIVES,
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AGENT FOR

George Wostenholm & Son,
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Celebrated I-XL Cutlery, Razors, &c.

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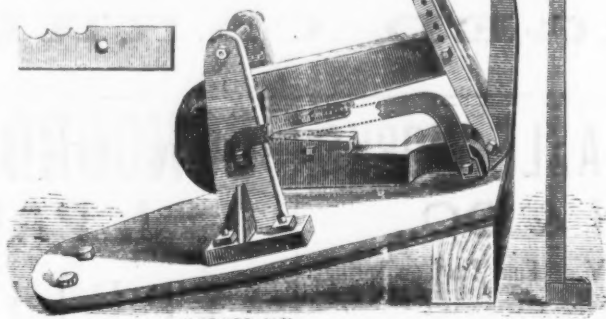
JOSEPH ELLIOT & SONS,
Manufacturers of Razors, Table Knives, &c.,
SHEFFIELD.

AMERICAN
PEN AND POCKET KNIVES,
MANUFACTURED BY
AARON BURKINSHAW, MASSACHUSETTS.

Improved Iron Cutter.

The accompanying cut illustrates a new iron cutter which has lately been put upon the market, and is meeting with a ready sale. With a machine costing \$75, one man can cut $\frac{3}{4}$ x 4 inch, or $1\frac{1}{2}$ inch round and square iron, the same machine cutting all varieties of round, square and flat iron up to the sizes mentioned. Both jaws of the cutter move alike, there being the same pressure up as down, so that when the iron is cut off there is not the slightest jar or recoil, and but little strain upon the machine.

Improvements in mechanics' tools are being made much faster than mechanics are generally aware of. Inventors come to us almost daily with their improved tools, many of which are really valuable, but few of which ever come into use, for the reason that the owner is not able to meet the heavy expense of making his invention known. If it is a new level, the inventor calculates that every carpenter in the land will buy one, and at a royalty of ten cents on each level sold, he figures out a profit of at least \$50,000. But he leaves out of the account that not one of the \$50,000 carpenters knows that he has such a tool until he has in some way informed them of the fact, and to do this thoroughly will cost at least ten cents each, or \$50,000 for the lot. As the cost has to precede the profits, it generally happens that the inventor cannot pay the one and does not get



IMPROVED IRON CUTTER.

the other. In this view of the case, we are always glad to notify our readers of new inventions when they seem to us of real merit.

These iron cutters appear to be a new departure in that line of tools, doing a much larger range and much heavier work than any other machine hitherto sold at the same price. Few people will believe that a machine weighing only 300 lbs., and worked by one man, will cut so large iron, and do it so perfectly, until they see it done. Made and sold by Miller's Falls Co., 78 Beekman street.

PHILADELPHIA CORRESPONDENCE.

PHILADELPHIA, June 22, 1874.

Although by all ordinary rules we should expect the usual summer dullness now, the prospect of the adjournment of Congress, due at this writing, has had a perceptibly beneficial effect upon general trade, and to it is probably due the late spurt in iron. Senator Thurman, in one of the million speeches on the currency, struck the keynote of every possible, real and permanent improvement in our present financial, commercial and industrial condition, when he desired "to make the people stop talking about what kind of money they were going to have, and go to work and earn it." A large portion of the distrust and depression incidental to the late panic has come of the fruitless and wordy discussions of what might or might not be likely to happen. As it is now, we will, within six months, forget there has been a panic, and, very possibly, before another Congress meets, be very much nearer to specie payments, through increased exports and bountiful crops, than any legislation could have brought us. Indeed, the history of the world shows that with scarcely an exception financial enactments, as a means of accomplishing a given end, are lamentable failures.

Peel's celebrated Currency Bill nearly bankrupted England; French and German legislation at different periods have had like effect, and we never had in this country an enactment upon finance which did not work precisely the converse of the expectation of its advocates. The sole salvation of this country or any other is in the industry of its people, and all public discussions of money questions sadly interfere with this. After this short sermon on the threadbare topic of the day, I am at liberty to devote my space to more interesting matter.

Mr. J. Blodgett Britton, of the iron masters' laboratory here, has lately issued a sheet circular entitled: "The variable character of the ores of iron, limestones, etc., with directions for selecting average samples for analysis." This circular contains more practical information than half the treatises on the metallurgy of iron, and should be not only in the hands of every iron manufacturer, but of every furnace manager in the country. The former will probably receive it through the liberality of the author, and they cannot do better than transmit it at once to the managers.

It is not often that we are called upon to notice English inventions adapted to American uses, but the high price of coals abroad has set the inventive British mind to work, and we must courteously concede that an English invention is nothing if not practical. The increasing popularity of open grates for home and office use, and the development of the extensive deposits of excellent Cannel coal in our country of late, makes the article under notice peculiarly desirable for our adoption. Whitwell's new patent economical fire grate, entitled the "Save-All-Waste," as its name implies, is designed to avoid the enormous waste of fuel in ordinary grates, and while retaining the comfort and cheerful appearance of the fireplace, to provide a much greater heating power with lessened consumption of fuel. The general arrangement, while so simple as to

be easily understood, deserves an illustration for thorough explanation, and this I hope to send you hereafter. The principle is, however, as follows: The "Save-All-Waste," a title which an American would immediately drop, as he would not be guilty of such thrift in our land of plenty, is arranged to supply a large quantity of fresh warmed air brought from the outside of the house into the room in which the grate is fixed. To effect this an iron box or air chamber is placed immediately behind the fire, protected by a brick; the cold air to this is brought from the outside through a flue, and enters at either side, or under the floor and hearthstone, through suitable openings. From this box or air chamber the air passes through a series of vertical pipes at the back of the grate, into an upper air chamber, concealed by the frontpiece, and thence directly into the room through registers. The air thus warmed is not burned, but of a healthy and agreeable temperature, this fact having been abundantly demonstrated by experiments with the aid of the hygrometer. The fresh warmed air circulating through the room and taking with it the carbonic acid and bad air from the apartment, passes through the fire and into the chimney

larly, the insidious foreign enemies of our ship building interests. At last his power was felt, his influence acknowledged, his reasoning appreciated. His promises were made good in his acts. His palpable productions, his handiwork, gradually kissed the waters; his ships demonstrated that American ships could be built in American shipyards; he proved that his labors were not in vain; he showed the enemy that the navigation laws of the country could not be repealed, and that honesty of purpose, strict attention to business, and fidelity, would, in time, be rewarded. This country to-day, and especially the shipbuilding interest, owe to John Roach a debt of gratitude they can never repay. He has by no means finished his labors, nor achieved the fame yet in store for him.

His aim is not the money his work will bring him, but the proudest ambition of his life is to see our fleets outnumber those of the world, and Great Britain especially. We venture to say that there is no journalist in this country to-day who has had better opportunities of watching the movements of Mr. Roach than the writer, or who has been more intimate with him, or has had better opportunities of knowing the true motives which have actuated him, step by step, as he has pressed onward in his struggle—for it has been a struggle, and a terrible one. Never have we heard him chide his competitors or his enemies, but he has sorrowed because they did not act in concert with him, to share the glory, and, if you please, the profits, of this war against the foreign shipbuilding interests, and we have reason to know that to-day he stands ready, as he did years ago, to join heart and hand with his rivals, to work in concert for a larger, a freer and more rapid development of the production of ships than has ever been known in this country.

At this time there should be no feelings between the ship builders of this country—and the whole body, from Maine to Texas, should be as united as the various parts of the completed ship. The man who has the best facilities for the construction of vessels certainly has a right to expect the best contracts, and he who has the best machinery for building quickly and cheaply will, of course, make the most money. These are plain, stubborn facts, and just ones as well. But to return to the subject of these notes: Whatever prominence Mr. Roach has obtained, whatever success he has gained, it has all been the results of his own efforts, and none should be envious of his honors or his position, but strive to emulate his course, and, if possible, to go up still higher on the ladder of fame. We write this from a purely disinterested standpoint. It is a true record of fact.

Mr. Roach had but few advantages and but few friends and scarce any encouragement; but he has thrived amidst obstacles and discouragements, and to-day may be looked upon as a man of marked success, wholly the result of his own efforts. At home he is the embodiment of all that makes a man worshipped by those who know him best. He is the best of husbands, the kindest of fathers, and the warmest of friends. In business he is sharp, quick, of wonderful perseverance, of indomitable energy, honest and square dealing, earnest and unwavering in his methods to gain his ends, and having set himself to the task of reviving our ship building interests, it is impossible to see how he can fail.

John Roach.

The *Nautical Gazette* says:
We have no reason to laud the acts, writings or sayings of John Roach, in reference to the revival of American shipbuilding, but simply to state some plain facts, which it seems proper to record on the page of history. Some four or five years ago an attempt was made to organize those interested in the various branches of the shipbuilding industry into an association, which should, by systematic and concerted action, do something practical toward awakening an interest in this direction. A few meetings were held, and the fact was soon developed that nothing could be done, because everybody was afraid that his neighbor might possibly gain some advantage which the other might not share in, and the whole affair fell to the ground. Jealousy, envy and bickerings marked all conversation upon the subject, and the prospect looked gloomy. Nothing daunted, John Roach struck out boldly and alone, determined to "do or die." His every move was watched, his every act was commented upon, and even obstacles, which seemed insurmountable, were put in his way. He heeded them not, but faithfully and earnestly pushed on. He enlarged his field of operations, he expended his power and influence, he was faithful to himself and to the great aim he had in view—the re-organization of our shipbuilding interests. Jealousy warmed into hatred, and John Roach stood alone, untrifled, and apparently as stoical as a Dutch general in time of peace. He apparently did not hear the clamor. He lived on the railroad, backward and forward, 'twixt New York and Washington, he traveled, keeping his own counsel, but gathering facts that were unanswerable to him against his enemies, and against, more particu-

larly, the insidious foreign enemies of our ship building interests. At last his power was felt, his influence acknowledged, his reasoning appreciated. His promises were made good in his acts. His palpable productions, his handiwork, gradually kissed the waters; his ships demonstrated that American ships could be built in American shipyards; he proved that his labors were not in vain; he showed the enemy that the navigation laws of the country could not be repealed, and that honesty of purpose, strict attention to business, and fidelity, would, in time, be rewarded. This country to-day, and especially the shipbuilding interest, owe to John Roach a debt of gratitude they can never repay. He has by no means finished his labors, nor achieved the fame yet in store for him.

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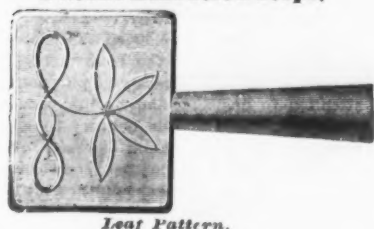
Mr. Roach had but few advantages and but few friends and scarce any encouragement; but he has thrived amidst obstacles and discouragements, and to-day may be looked upon as a man of marked success, wholly the result of his own efforts. At home he is the embodiment of all that makes a man worshipped by those who know him best. He is the best of husbands, the kindest of fathers, and the warmest of friends. In business he is sharp, quick, of wonderful perseverance, of indomitable energy, honest and square dealing, earnest and unwavering in his methods to gain his ends, and having set himself to the task of reviving our ship building interests, it is impossible to see how he can fail.

Railways without Switches, Turnouts, or Crossings.—Mr. Charles Jordan Ironfounder, Newport, Monmouthshire, proposes to stop one extensive source of railway accidents in what is certainly a thorough manner. He proposes to make the up and down main lines without the usual switches, turnouts and crossings, the lines being continuous from end to end, and to work such road by transferring a train or trains at stations, or where shunting is necessary, or at junctions with other railways, from the main line to the adjacent siding, by lifting the train bodily from one line to the other. The lifting will only be an inch or two, and the hydraulic apparatus as now constructed will make nothing of the weight, while as to time, Mr. Jordan calculates that a few minutes will suffice to transfer a train from one road to another without disturbing a single passenger. The whole work of a station, as regards the hydraulic apparatus, may be done by one, or at large stations, two lads. The time saved in shunting will be very great, and the risk of collision reduced to the lowest possible point, where Mr. Jordan's plan, for which he has taken out a patent, is adopted.

The Limits of Great Cities.—The London "Builder" thinks that the time will soon come when the question of the extreme limit to which cities can be extended will be solved. London has now an estimated population of 3,400,000, and the question suggested by the "Builder" arises from the estimate that 600,000,000 cubic feet of carbonic acid gas are expired in London every twenty-four hours by human beings alone, and that 14,000 tons of coal are daily consumed there, a great portion of which is cast into the atmosphere in the partially volatilized form of smoke. But, fortunately for the dwellers in London, and unfortunately for the theories of croakers, there are miles of fresh air above the city constantly replacing the vitiated atmosphere of the streets. London may be extended indefinitely with, in all probability, no perceptible change in the life supporting power of her atmosphere. The registration of births and deaths in England is so thoroughly made that the estimates of population based thereon very nearly agrees with the actual count from the census returns, and such registration has as yet given no sign of any increased ratio of deaths following the growth of London. In this connection the fact may be noted that London contains as much population as the seventeen next principal cities of Great Britain and Ireland, and that, according to the latest estimates, the population of London is increasing in a larger ratio than that of the other cities.

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Patent Embossed Steps.



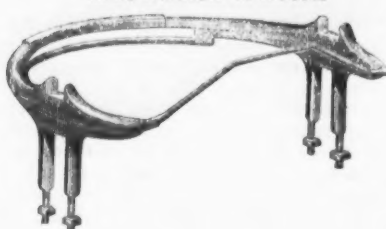
Leaf Pattern.

King Bolt Yokes.

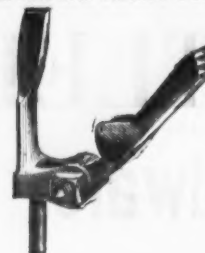


Established 1850.

No. 6 Fifth Wheels.



1871 Pattern Shaft Couplings.



Patent Cross Bar Steps.

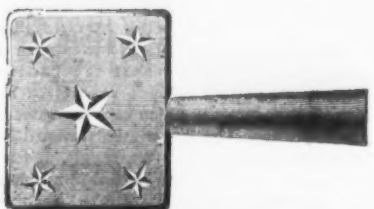
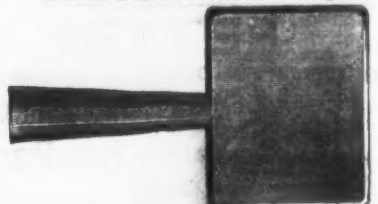


Upper View.



Lower View.

Solid Plain Pattern Steps.



Star Pattern.

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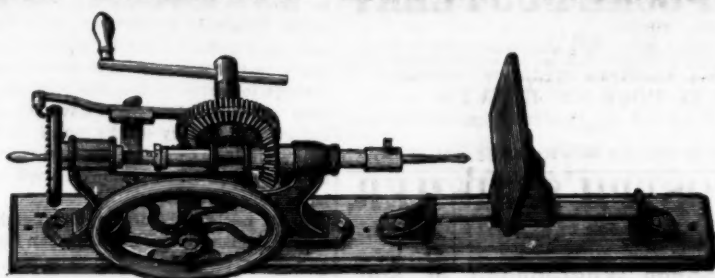
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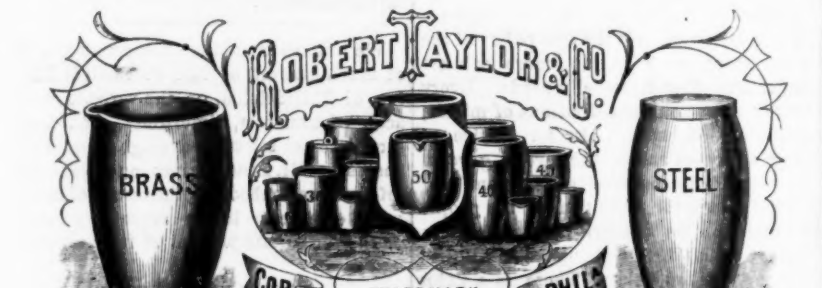


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New York, Thursday, June 25 1874.

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CONTENTS.

First Page.—Pumping Engine for the Pittsburgh Water Works.
Third Page.—Lead and its Preparation.
Fifth Page.—New Patents.
Seventh Page.—The Minerals of Muskingum Co., Ohio.
Ninth Page.—Business Items.
Eleventh Page.—Improved Iron Cutter. Philadelphia Correspondence.
Fourteenth Page.—The State of Trade at Home and Abroad. The New Currency Bill. The Legal Status of Price Lists. The Cost of Standing Armies. Hall vs. Hall, Kimbark & Co.
Fifteenth Page.—Hall vs. Hall, Kimbark & Co. (Continued). The Proposed Mechanical Laboratory at the Stevens Institute. The Variable Character of the Ores of Iron, Limestones, etc., with Directions for Selecting Average Samples for Analysis.
Sixteenth Page.—Trade Report.
Eighteenth Page.—Trade Report (continued).
Nineteenth Page.—Our English Letter.
Twenty-third Page.—The Iron Age Directory.
Twenty-fourth Page.—Pumping Engine for the Pittsburgh Water Works (Continued from page 1). Northwestern Furnace Notes. English Capital for the Black Valley, Bedford County, Pa.
Twenty-sixth Page.—New York Wholesale Prices of Hardware and Metals.
Twenty-seventh Page.—New York Wholesale Prices (continued).
Thirty-first Page.—Philadelphia, Buffalo, Cincinnati, and Detroit Hardware and Metal Prices.
Thirty-third Page.—Chicago, Boston, and St. Louis Hardware and Metal Prices.

The State of Trade at Home and Abroad.

There are, as yet, no signs of the promised improvement in the iron trade of the United States, and it must be confessed that present indications warrant the belief that the depression will continue for some weeks longer. The stocks of pig iron in makers' hands are largely in excess of the demands of consumers, and as there is no speculation they continue to increase slowly, notwithstanding the restricted production. We hear of furnaces blowing in from time to time, but more are going out of blast, and at least two-fifths of the furnaces in the country are standing idle. It is impossible to quote prices with the market in this condition, but in general terms it may be said that the few buyers have things pretty much their own way. Best grades of Lehigh gray forge have lately been sold below \$25 at furnace; Schuylkill irons at \$24 for gray, and \$20 for white; Susquehanna gray at \$22-50 to \$25 at furnace, and good No. 1, f. o. b. at seaboard at \$28-50. At Pittsburgh large sales of gray forge have been made at \$27, four months, but the tendency of prices in the West is steadily downward. In no Eastern market is pig iron fairly quotable at a price which would cover the cost of production, and as any change must be a change for the better, mill owners having orders or

expecting them could not make a mistake in laying in well selected stocks in advance of better times. The market for bar iron is still unchanged, but a little more activity is noticeable at the mills. The Philadelphia mill price is 28c. In Central New York and the interior of New England 3-25c. is a fair average, while in this market the price is about 8c. The mills have not accumulated any great stocks since the panic, having run on half time on an average, while consumers' stocks are known to be unusually small throughout the country. There has been some activity in bar iron at Pittsburgh this spring, but at prices as low as 2-5c. in some instances; while with an increasing production and a decreasing demand, there is a pressure to sell, and considerable lots have changed hands at 2-25c. to 2-4c. Labor is generally accommodating itself to the changed condition of affairs, and while we hear of some strikes, the workmen are more reasonable than was expected. The only feature of the situation which affords reasonable grounds for congratulation, is the absence of anything like demoralization in the iron trade. The furnace and mill owners have in most instances suffered heavy losses, but they have done the best they could under the circumstances, hoping for better times. We have had but few failures of importance, and while more are likely to come before the end of the summer, there is no danger of a panic in the iron trade. The improvement will find makers in condition to take advantage of it, and we have no doubt they will manifest the same judgment in gradually increasing production that they have shown in decreasing it since September.

Abroad, the situation in the iron trade is quite as bad as it is in this country. In England the business is in a wretched condition, and wholly demoralized. Many failures are reported in the iron and coal trades, as well as in other important branches of manufacturing. The two causes which, in Great Britain, keep the iron trade in a critical state are the high price of fuel and the constant wages dispute. "The great difficulty," says a leading trade journal in a well considered article on this subject, "is coal and coke." "The iron trade can never recover until the fuel, which forms its foundation, can be had at reasonable rates. It is hopeless to expect a return to the prices of 1871." "In spite of all the new coal fields which have been opened up; in spite of all the inventions for economizing coal and utilizing the waste heat of furnaces, we are certain that coal can never again be bought at 1871 prices. There are at this moment twenty-five thousand colliers on strike, yet the supply of coal is more than equal to the demand. The cloud is black, and it overshadows the great iron producing districts of England and Scotland; it darkens the steel and cutlery capital of Hallamshire; and in the Black Country, and in the younger Black Country further north, it causes sorrow and suffering. In spite of closed pits in entire districts, and half-time in nearly all, coal accumulates, and the price falls, while trade droops from day to day, only one result is at hand—such a general and sweeping reduction as shall once more bring a tide of reason, able and healthy business—no more flood tide to bring its subsequent depression and distress, but a season of moderate activity, in which the British ironmaster may once more fairly compete with his foreign rivals. The wages dispute is a cloud no bigger than a man's hand. This fuel difficulty overshadows it altogether. Once coal has fallen to its real value, the other difficulty will die away, and the iron trade of England resume its place in the commerce of the world. But there will be much ground to re-conquer. Our foreign rivals have shot ahead, and have planted their foot very firmly in many lands where England once reigned supreme." In Scotland there is no material improvement, although our latest mail advices show a slight advance in prices of warrants. There is comparatively little pig iron held in stock at Glasgow, the quantity stored by Messrs. Connel & Co. being only 25,225 tons at May 20th (a decrease of 4689 tons on April 30th), while the Forth and Clyde Canal Company have none. Makers of finished iron cannot secure many orders, and those which they do get are such as to barely enable them to make ends meet. The struggle between the ironmasters and their miners still continues, with no prospect of reaching a satisfactory settlement for many years to come.

The latest news from the Continent is somewhat more favorable, an improvement in the demand being reported. In Luxemburg, where the stocks of pig iron are enormously large, prices have fallen to such an extent lately that consumers are commencing to buy. But in neither Belgium nor France can the production of pig iron be carried on at a profit.

The New Currency Bill.

At the eleventh hour, after all hope of satisfactory currency legislation was abandoned, and the people of all classes were awaiting with impatience the hour fixed for adjournment, Congress passed the bill reported by the Conference Committee, and the President signed it almost before the ink was dry. As the text of this bill is given in another column, we need only briefly summarize its provisions in this place, as follows:

1. It sanctions the increase of the legal tender circulation from \$356,000,000 to \$382,000,000. In so doing Congress has made a virtue of necessity. Whatever the wisdom and propriety of the course adopted by Mr. Richardson in issuing \$26,000,000 of the so-called reserve of \$44,000,000, the amount thus issued could not be retired at this time without causing wide-spread commercial distress. We are certainly in no condition to bear contraction, and unless the legal tender circulation were fixed at \$382,000,000, the Treasury would have to recall the \$26,000,000 in circulation without the authority of Congress. This may be called *ex post facto* legislation, but it was necessary under the circumstances, and Congress could not have done otherwise without leaving in the hands of the Secretary of the Treasury dangerous discretionary powers, which might or might not be used wisely and honestly.

2. It substantially abolishes the difference between greenbacks and national bank notes, and by reducing the legal reserves which the national banks are required to hold to 5 per cent., adds to the active circulation about \$30,000,000 hitherto locked up in the vaults of the banks.

This is a wise provision and one which reforms an evil which should never have existed at all. Probably the banks will keep a voluntary reserve during most seasons of the year equal to that hitherto required by law, but in periods of stringency they will be able to accommodate the merchants without having to suddenly contract their credit to make good their reserves, or reach the limit at which all lending must cease. In other words, the panic line is abolished, and the money lenders of "Poverty Corner" will no longer be able to exact their pound of flesh from the merchants who need money and cannot get it from the banks.

3. It provides for the transfer of \$55,000,000 of national bank circulation from the East to the West.

This is not likely to prove of much consequence as a financial expedient, since, if carried out, it would merely transfer the privilege of issuing notes without any actual transfer of circulation. The national banks would have to buy bonds in the East at 115, and on these they would receive notes to the amount of 90 cents on the dollar, thus temporarily increasing the circulation in the East and diminishing it in the West. In other words, it would cost the West \$70,000,000 to procure its \$55,000,000 of bank notes, and the Eastern banks would find the transfer greatly to their advantage, as it would considerably increase their ability to loan money, and leave them free to reorganize under the State law and conduct their business without circulation, as many of them are anxious to do. Taken as a whole, however, the bill is a great deal better than any we had reason to expect from Congress, and we are thankful for the relief it will afford.

The Legal Status of Price Lists.

The statement of the attorneys of Messrs. Hall, Kimbark & Co., of Chicago, in reply to the statement of the attorney of Mr. Geo. D. Hall, of St. Louis, which appears elsewhere in this issue, concludes, so far as we are concerned, the discussion of one of the most interesting cases which has been before the courts for many years. We have given it so much space in our columns because of the importance of the principle involved to the trades we represent. In our editorial discussions of the case we have endeavored to regard it disinterestedly, and while we have affirmed and reaffirmed our opinion that Mr. Hall had no legal or moral right to damages from Messrs. Hall, Kimbark & Co., because of the refusal of that firm to fill his order for 3000 pairs of seat springs at \$1 per pair, we have given his attorneys all the space in our columns they desired, and have let them state the case in their own way. We cannot, therefore, be accused of unfairness. Our own opinion in the matter was based upon best information at our command at the time it was formed, and we have seen no reason to modify it as the discussion progressed. Our reason for giving notice that the discussion is terminated, is that both sides have had a full and fair hearing, in which they have set forth all the facts likely to be of public interest, and that, if prolonged, it would probably degenerate in a personal dispute between attorneys upon points which, as the case now stands, would be likely to involve the question of veracity.

As we have before said, it is greatly to be regretted that a case so interesting, in-

volving so important a principle, should have reached so unsatisfactory and inconclusive a settlement. As interpreted by Judge Treat, the law defining the legal status of price lists is substantially this: Any merchant who shall send out or distribute price lists, stating the price at which he holds his goods, and the terms upon which he will sell them, shall be considered as party of the first part to an open contract, which any one may close and make binding in law by sending an order for any quantity of said goods which he may wish to buy, said order constituting the person sending it party of the second part to the contract aforesaid, which is thereupon consummated, whether the views of the party of the first part and the party of the second part agree or not. Should the party of the first part refuse to fulfill the terms of said contract, he shall be liable in damages to the party of the second part to the amount of the difference between the price of the goods quoted in the price list aforesaid and their market value at such time as the jury shall see fit to agree upon. All price lists shall henceforth be considered unconditional offers to sell, which every person to whom they are sent may consider as made personally to him, without any reservation whatever, and the merchant sending out such price lists forfeits all right, hitherto accorded him by established and recognized commercial usage, to refuse orders which he may not wish to fill, provided such orders are received from persons to whom he has sent a price list.

This, we believe, is a fair statement of the law as interpreted by Judge Treat and enforced against Messrs. Hall, Kimbark & Co. by verdict of the jury. That it is an absurdity upon its face, we do not need to tell our readers.

The Cost of Standing Armies.

The proposition to gradually reduce the standing army and navy of the United States until they shall be mere skeleton organizations—the nuclei of an army and navy, to be recruited, in case of necessity, by the enrollment of volunteers or by draft—has given rise to a good deal of discussion, and the policy of Congress has been criticised with more severity than intelligence. In our judgment, it is the true policy of the government to keep no more soldiers under arms than it actually needs. Every State has one or more divisions of militia, fairly drilled and ready for service at short notice on call of the several governors, and if the national government cannot rely upon the patriotism of the people to maintain its authority and execute its laws, we had better change our political system without delay. There is a point beyond which it would be unsafe and unwise to reduce our military and naval systems, but all the army we need in time of peace is a small force of soldiers to keep the Indians on their reservations, and a nominal garrison in our permanent fortifications. A large standing army is a dangerous thing in any country, especially in a republic. It creates a military power which may become formidable in the hands of designing and ambitious men, and when no such danger exists it is an incubus upon the country, withdrawing a large body of able bodied and intelligent men from the useful industries which contribute to the national wealth—a great consumer, which produces nothing and is supported upon the products of honest labor. For this reason, if for no other, we should keep our army as small as possible. The greatness and prosperity of the United States, and the welfare and happiness of the American people, will be obtained not by military or naval conquest, but by the more substantial victories of peace. The army which will give us prestige and power among nations is our army of skilled mechanics, commanded by enterprising manufacturers.

To appreciate the extent of the burden imposed upon a nation by the maintenance of a great military establishment, we need but look abroad at the several European countries now staggering under the weight of their preparations for a war which, if not imminent, is pretty sure to come before long, from the fact that these very preparations are a perpetual menace to the peace of Europe. England has three soldiers to every 1000 of population in Great Britain; Italy and Belgium twelve; France and Austria fifteen, and Germany twenty-one. In all Europe there are probably as many as 4,500,000 or 5,000,000 men under arms; and it is not impossible that the total is much larger than this. It was fully 5,000,000 in 1871, and the total has been rather increased than diminished since then. What is lost to human progress by the withdrawal of these five millions of able bodied young men from the useful industries, for which they are to a great extent unfitted by their experiences of military life, will be apparent when we remember that, according to the census of 1870, the

total number of men in the United States engaged in manufacturing, mining and mechanical industries, in trade and transportation, and in professional services, was only 5,144,132.

But even this comparison fails to convey an adequate idea of the drain upon the resources of Europe incident to these colossal preparations for war. The men thus withdrawn from peaceful pursuits are in the prime of life, and are those whose issue would be the flower of the rising generation. As it is, the severance of family ties and the cultivation of habits fatal to domesticity in those who enter the army early in life, cannot fail to check the natural increase of population and to encourage the growth of the social evil, which will sooner or later vitiate the life blood of a nation and lower its standard of public morals. We must also remember that the five millions of men kept in idleness—at least so far as any useful labor is concerned—are large and wasteful consumers. They must be fed, clothed, supplied with arms and ammunition, transported and housed. To supply their wants requires the labor of thousands of skilled mechanics and intelligent tillers of the soil, while the productive labor of the country is further taxed to pay the wages of the soldier, and to meet the enormous expenses incident to the maintenance of great military establishments.

With these facts before us, it is evident that no nation can afford to prepare for war, much less to engage in it; and were the question of cost calmly considered, few of them would do so. We have not much hope of soon witnessing the dawn of the era of universal peace on earth for which so many good people hope, and of which the Geneva arbitration gave promise; but the first step in that direction is the disbanding of great armies. The maxim is as true as it is old, that evils are best avoided by avoiding the appearance of evil, and with experiences so freshly in mind as those of 1859, 1866 and 1870, the greatest achievement that could now distinguish the statesmanship of Europe would be that of conferring on the over-taxed and impoverished peoples of the different countries the blessings of universal disarmament.

We publish in another column an article of much interest, by Mr. J. Blodget Britton, of Philadelphia, on the variable character of iron ores, limestones, &c., with directions for selecting average samples for analysis. Mr. Britton gives much valuable information, embodying the results of many years' experience in the laboratory, which merits the careful perusal of furnace managers.

HALL vs. HALL, KIMBARK & CO.

Statement of the Attorneys for the Defendants.

To the Editor of *The Iron Age*: Your issue of the 4th inst. contained a statement over the signature of John C. Orrick, Esq., as attorney for the plaintiff in the suit of Geo. D. Hall vs. Hall, Kimbark & Co., recently tried in this city, which we desire, through your columns, to notice. But before doing so, we wish to correct a statement made by Mr. Orrick in a former communication to your paper, which appeared in your issue of May 7th. In that statement he says: "In letter of Hall, Kimbark & Co., under date of February 17th, 1873, they admit that their circular of February 5th was an offer, and that George D. Hall's telegram of the 8th was an acceptance." We think the following (which is a true copy of that letter) hardly supports his assertion:

CHICAGO, Feb. 17th, 1873.
Yours of the 15th inst. is received and fully noted. Since ours of the 12th, we have received information of your breaking your contract with the Illinois Iron and Bolt Co. to accept the offer of Messrs. P. & W., and of your attempt to break with the latter in order to accept ours. In the light of these facts, it seems quite absurd for us to discuss points of mercantile honor with you. So far as strict points of law are concerned, we are willing to try those with you at any time.

Yours, respectfully,
HALL, KIMBARK & CO.
Before proceeding to discuss the points of law made by Mr. Orrick in his last communication, we desire to refer briefly to his statement concerning the offer to make the judgment in this case \$3000. He says: "As his attorney, I know that he (meaning Mr. Hall) proposed to Hall, Kimbark & Co., through their attorneys, to make the judgment \$3000 in case the court decided the law for Mr. Hall and against H., K. & Co." This is incorrect. Mr. Hall never spoke to us about the matter. The facts are these: Recognizing that the case presented a clear question of law on the construction of the circular of Feb. 5th, the telegram and correspondence between the parties, one or two interviews occurred between Mr. Orrick and ourselves with reference to dispensing with a jury, and agreeing upon the measure of damages, in the event the court should find for the plaintiff on the question of law above referred to. Mr. O. claimed that \$1350 was the proper measure of damages, and we that it should be only \$700. After ascertaining that we could not agree upon the amount, and after our negotia-

tions had closed, Mr. O. remarked, in a jocular way, "You had better let the judgment go for \$2000, so that you can appeal from it." We replied in the same vein, to the effect that he would be the appealing party. From the above Mr. O. gathers material for the statement that a deliberate proposition was made by Mr. Hall. We certainly never considered it a proposition, and from the manner it came we think Mr. O. did not, at the time. It was simply a part of the very common derision of an antagonists' case, so often resorted to in friendly interviews between attorneys. He further says, in the same connection: "This was before the trial, and in full view of the fact that one or the other party might wish to appeal to the Supreme Court." The inference from the foregoing is, that Mr. Hall, in the event of a decision adverse to him, was to be benefited by such a stipulation in securing an opportunity of appeal.

Mr. Orrick is too good a lawyer not to know that, having claimed \$5000 damages in his petition, the plaintiff was entitled to an appeal without any stipulation, even though the verdict was under \$2000.

Proceeding to the next sentence in his communication, we find the following language: "And further, that our consent after verdict could not give jurisdiction to the court." We confess to some surprise that Mr. Orrick should, by the use of such language, attempt to convey the impression that, by an arrangement of counsel, the case could not have been appealed, for he well knows it is a daily occurrence that verdicts and judgments are set aside by courts on account of counsel, and cases reopened for a new trial, which being done, any stipulations concerning amount of judgments or otherwise can be made, and the cause immediately re-submitted for findings accordingly. But while upon this point we desire to say, that neither your article to which he refers, nor his statement, covers the offer made by us to Mr. Hall through his counsel. What we offered to do was this: If plaintiff would set aside the judgment rendered, and re-submit the case on a stipulation for a judgment of \$2000, we would pay the judgment for \$1350, whatever decision the Supreme Court rendered on appeal, also pay to Mr. Orrick a reasonable fee for his services in Mr. Hall's behalf in the Supreme Court, together with all costs taxed therein.

This proposition Mr. Orrick, after consultation with Mr. Hall, declined. By such an arrangement Mr. Hall could lose nothing, but, on the contrary, if successful in Supreme Court, would gain the difference between \$1350 and \$2000. It is exceedingly difficult to draw any other inference from the refusal of Mr. Hall to agree to the foregoing proposition than the one suggested in your columns, viz., "that he was afraid the decision of the Circuit Court would be reversed." The reason why we advert to this portion of the statement of Mr. Orrick is the same as that given by him, viz: "We simply wish, in this connection, to see that he (Mr. Hall) is not placed in a false position." And now, with reference to some of the points which his communication attempts to make upon the legal aspects of this case. Plaintiff declares upon a written contract and claims damages for a breach of the same, and in proof of such contract he put in evidence the circular, telegrams, and correspondence set out and referred to in our communication published in your issue of May 7th. The only question (except to the measure of damages) which could be presented to the court under the pleadings in the case was simply this: Did the circular of Hall Kimbark & Co., dated February 5th, and the telegram of Mr. Hall in reply thereto, constitute a contract? If so, Hall Kimbark & Co. were liable, otherwise not. The only words used in the circular material to the question under consideration are as follows, viz: "Our present price for blue seat springs is as follows: On orders for 100 pairs and over in one shipment \$1 per pair." The telegram referred to is: Ship me 2000 pairs 1 1/4, 1000 pairs 1 3/4, Jenks' seat springs at \$1. Answer. It will not be denied that the minds of the parties must meet upon all the essential elements of their negotiations before there can be a contract—there must be a distinct and definite offer of a definite subject of sale—quantity and price are essential elements of every contract. Mr. O. in his communication does not meet the question presented by the facts, he says: "In this case Hall, Kimbark & Co. were iron merchants, they held up their whole stock for sale, hence the law says that when such a person fixes a price upon an article the presumption is that this is for the purpose of sale." This is begging the whole question. Did they, because of the fact that they were merchants "hold up their whole stock for sale" to any and every person who might wish to purchase? Had they no right to choose their customers, even though they fixed prices upon their goods? We are strongly inclined to the belief that mercantile transactions would be very infrequent if such were the case. Again, the conclusion reached, as above stated, is a non sequitur. We most emphatically join issue upon the statement that "when such a person fixes the prices upon an article the presumption is that it is for the purpose of sale." The authorities are numerous that there must, on the one hand, be a clear and distinct offer to sell some definite thing or subject of sale, which offer must be unconditionally accepted, otherwise there can be no contract. The minds of the parties must meet. In the case of *Smith vs. Gowdy et al* reported in 8th Allen, p. 566, it appears that on Sept. 30, 1862, the plaintiff wrote defendants inquiring how many rags they had on hand and the prices for them. On Sept. 6th, 1862, defendant wrote: "We have about a ton each, white and colored rags, and our prices are: 3 1/2 cents for colored and 7 cents for white." On Sept. 9th, 1862, plaintiff replied "We will take the rags at the prices you name." The court (Metcalf J.) in delivering the opinion, says: "The second letter was the defendant's reply

to the first, merely stating the quantity of rags which they had and the price thereof. Thus far there was no offer of one party to buy nor of the other to sell." In speaking of the third letter the court says: "This was the first offer in the case." So in close analogy it follows that Hall, Kimbark & Co.'s circulars stating prices was no offer, and that Mr. Hall's telegram ordering seat springs was the first offer, and that was not accepted. Also in the case of *Stymaker vs. Irwin*, reported in 4th Wharton, Repts., p. 369. The defendants wrote plaintiff, Feb. 15th, 1836, stating their price for iron for spring delivery, using these words, "Our terms are \$30 per ton," etc., and inviting plaintiff to send in an order. In due course of mail plaintiff wrote defendant as follows: "Your favor of the 15th inst. was duly received, in which you inquire what quantity of metal we will take for spring delivery; in reply to which we say we will take 3 ark loads, if delivered in that way, which we would greatly prefer, or 150 tons if delivered by canal; the terms proposed we will comply with." The Court (by Sergeant, J.) in delivering the opinion says: "The last letter did not complete the transaction, it suggested a new proposal, and required another communication from the defendant to produce that effect. It might not suit the defendant to furnish 150 tons in the spring, and no one but himself could say that it would. He has not said so." So in the case under consideration Hall, Kimbark & Co. never had said that they would furnish Mr. Hall with 3000 pairs seat springs. It certainly cannot be claimed that the circular of February 5th, issued by Hall, Kimbark & Co. to the trade generally throughout the country, could be any more of an offer than if they had written a private letter to Mr. H., as was the fact in the cases above cited. There are many other cases in the books of similar import to the above which we might refer to if space permitted.

The gentleman further argues that the language used in the circular, to wit: "Our present price," etc., is an offer to the person to whom it was sent, and that if that phrase "be held not to be an offer, then a fraud would have been perpetrated upon the public, and many dealers would have been deceived and expended their money for telegrams for nothing."

The circular, fairly construed, was nothing but a price list, sent out for the information of the trade. It was not intended as an offer, and Mr. Hall's telegram clearly shows that he did not construe it as such, else why the word "answer" appended thereto. We are unable to perceive where the "fraud" upon the public comes in, and particularly toward Mr. Hall. The evidence, as stated in a former communication, shows that 5000 of these circulars were issued. Let us suppose that one-fourth of those to whom they were sent had made similar orders, if the theory of the counsellor be correct, Messrs. Hall, Kimbark & Co. would have been obliged to furnish 3,750,000 pairs of seat springs at \$1 per pair. The jury found that they were worth, on the 14th of February, 45 cents more than the circular price per pair. If that was a fair price, Messrs. Hall, Kimbark & Co. would have sunk the modest sum of \$1,687,500, and upon the theory that they intended to incur that liability toward the public, for unless they did so intend there was no meeting of minds, and hence no contract or liability to any person receiving the circular. We are unable to see the distinction between the case made by the circular and the publication of a price list in a newspaper which a merchant mails to the trade. The cases are parallel, and if the argument of the gentleman be correct, the merchant who thus advertises is bound to sell to the extent of his entire stock at the price named, no matter what advance may have occurred.

Again, there was no definite quantity named in the circular. The language is: "On orders for 100 pairs and over." The law says that the quantity must be definite. Was it in the minds of the parties sending that circular, and does it bear the construction that parties might order such quantities as they chose, without further treaty or negotiation?

And now with regard to the admission of evidence concerning "commercial usage," about which Mr. Orrick has so much to say in his communication. It is true that testimony was taken by the plaintiff in Chicago, whereby opinions of merchants were elicited as to whether Hall, Kimbark & Co., by such usage, were bound to fill the order of Mr. Hall, and, of course, those opinions were based upon the construction to be given to the circular. As before stated, the suit was grounded upon a written contract, and it was for the court to give a construction to the circular and telegram, and the opinions of witnesses could not be received. The law imposes upon the court the duty of telling the jury the legal effect of those papers. There was no latent ambiguity in the language used. There are certain cases where oral testimony is admissible to explain the meaning of terms employed; for instance, A offers to sell B 500 bushels of good barley at a price named. B replies that he will take that quantity of fine barley at that price. In suit by B against A for refusing to deliver the barley, it is competent to show that there is a distinction known to the trade between good and fine barley, but in the case under consideration no such question arises; it seldom occurs that any two circulars are worded alike, and hence there can be no established usage among the trade as to the meaning to be given to such language as that employed in this case. Had such testimony been received the court must have instructed the jury to disregard it, and lawyers on either side who admitted such testimony without objection would have been justly answerable, and here we will do Mr. Orrick the credit of saying he conceded that the same was wholly irrelevant.

LEE & ADAMS, ATTYS FOR
HALL, KIMBARK & CO.
ST. LOUIS, MO., June 18, 1874.

The Proposed Mechanical Laboratory at the Stevens Institute.

We have received the following letter from Prof. Thurston, which will interest many of our readers:

STEVENS INSTITUTE OF TECHNOLOGY,
DEPARTMENT OF ENGINEERING,
HOBOKEN, N. J., June 18, 1874.

Editor of *The Iron Age*: DEAR SIR:—Your issue of the 14th instant has just been brought me, and my attention called to the editorial in which you so kindly refer to the project of a mechanical laboratory, which has been generously assisted by the trustees of the institute. In regard to the method of securing contributions of apparatus and funds, I would say that no special effort will probably be made.

The plan is intended to meet an evident want, and it is anticipated that engineers and manufacturers who see the advantages to be secured, will not require much solicitation when the present dullness of trade shall have passed away.

As an illustration of the favor with which the plan is regarded, I may state that I received, a day or two ago, from a well known manufacturing firm, a copy of their illustrated circular, with a request that I would select from it any and all machinery which might answer my purpose, and it should be forwarded free of cost. Still further assistance was promised when the completion of new designs should enable these public spirited gentlemen to offer it. This is not the first, and I presume that it will not be the last, uncollected contribution to the proposed mechanical laboratory. Very respectfully,
R. H. THURSTON.

The Variable Character of the Ores of Iron, Limestones, etc., with Directions for Selecting Average Samples for Analysis.

There are few, if any indeed, of what may be called workable mines of iron ore that produce mineral of unvarying composition. Some of the richer magnetites of apparently igneous origin found in veins traversing the denser strata, approach nearest to uniformity; but they are far from being strictly homogeneous.

The leaner ores vary exceedingly in the relative proportion of their constituents. The variation throughout the mine may, it is true, be very nearly constant, and so give to the mass or whole some one characteristic quality; and this, except when the ore exists in distinct or irregular or broken strata, is pretty generally the case. Thus, we find the yield of one mine always producing a red short iron, and that of another a cold short iron, etc. But if we select, say a dozen pieces of ore from as many different parts of any one mine, whatever may be its general character, we will find upon strict analysis that no two of them are precisely alike in composition. One piece may prove rich in iron, and another lean. A third may contain sulphur, phosphorus, or some other substance in excess, while a fourth may contain but a trace; and so with each of the remaining pieces, the shades of difference being very slight between some, but very marked between others. Even several parts of a single piece no larger than an apple may prove so materially different in composition as to make it seem as though they had been obtained from entirely different mines.

The eye can never detect all the various constituents of an ore, and, except to a limited extent, is a most deceiving guide. This being the case with the great majority of ores, it must be evident that the analysis of any one or two small lumps or pieces should not be depended upon for ascertaining the value of the mass in the mine for general furnace use. Nevertheless, it is a very common practice with furnace men, when they wish to obtain a chemist's report upon an ore, to send merely a single piece, and that, too, a very good one, perhaps the cleanest and handsomest they were able to find, in fact, a cabinet specimen. By doing so they of course obtain a very favorable report, but one of no practical use whatever to them—worse than worthless, for it will certainly mislead if depended upon.

The true value of an ore can be learned with certainty by proper quantitative analysis, but only when the sample analyzed is strictly an average one; and such a sample may be obtained very easily by carefully following a few plain directions. Select (let the manager himself) from the mine, stock heap, or supply at the tunnel head, as may be most convenient, a pound or so of each of fifteen or twenty or more different parcels, hard and soft, good, bad, and indifferent, with a fair proportion of the accompanying dirt or trash, selecting precisely the kind of material that would be put into the furnace. Then reduce the several parcels one by one separately to coarse powder, which is best done in a goodly sized clean cast iron mortar, and without sifting or drying, take about a common wineglassful, or a little less, of each, and throw it into any suitable vessel, a clean, dry bowl or wash basin, for instance, and then what is in the basin stir well and mix together, and afterward throw the mixture back again into the mortar, and more thoroughly mix by a little trituration. Of the triturated mass reserve two or three ounces, which will be more than ample for all ordinary analytical purposes, and a convenient quantity to be sent off by mail. The remainder may be thrown away.

Where the intention is to use together ores from different mines, that is, to work the furnace upon a mixture, a practice which cannot be too highly recommended, and which, in many localities, is always pursued, an average sample of each kind should be obtained, and the several samples be analyzed separately.

By taking a little intelligent care in the first instance, and learning accurately the composition of the raw material intended to be used, all guess work, which is another name for bad work, in the subsequent mixing of the ores and working of the furnace, may be obviated.

Beyond all question, as a general rule, a furnace will work more uniformly and to better advantage with several ores mixed together than with one, for the reason that the different constituents assist in balancing each other. The mass of such mixture is, of course, more fusible; and less fuel, flux and fuel are required.

Limestones.—These are less variable in their composition; but it is unsafe to depend upon the analysis of any single piece. Better select eight or ten or more separate parcels, and make a true average sample. If, however, the breast in the quarry shows strata or seams of stone of evidently different composition, and which can be worked separately, it is better to have samples from each seam analyzed in order to learn which is the best. The alternate use of stones of widely different composition will, as a matter of course, cause irregularity in the working of the furnace, as well as in the quality of the iron.

Thirty-five average samples of limestone, which had been found by actual use to give the most satisfactory results in fluxing, were received from as many different furnaces, and carefully analyzed. Their average composition was found to be as follows:

Carbonate of lime.....	85.50
Carbonate of magnesia.....	5.36
Insoluble earthy matter.....	4.03
Carbonate of protoxide of iron.....	1.10
Alumina.....	1.30
Water.....	.49
Solid black carbonaceous matter.....	.09
Oxide of manganese.....	trace
Undetermined matter and loss.....	.74
100.00	

Limestones not unfrequently contain humus and some soda and potash, and also sulphur and phosphorus in combination with the other constituents, usually, though, in limited quantity. The sulphur does little injury in the blast furnace, because, being combined as sulphate with the lime, it passes into the slag and runs off. The phosphorus, however, having a strong affinity for iron, is apt to become reduced in the metal, a fact which should not be forgotten by those who aim to make pig metal for conversion into Bessemer steel. Stones the richest in lime will as a rule give the best results in fluxing. It is the lime alone that is wanted, because the other substances requisite for the formation of slag usually exist in excess in the ores; hence the leaner the stone the more of it must be used.

The use of oyster shells as a substitute for limestone is limited to sea-board localities. An average of some analyses of air dried shells from a furnace at Baltimore, showed results as follows:

Carbonate of lime.....	95.45
Carbonate of magnesia.....	.85
Insoluble earthy matter.....	1.34
Sulphuric acid.....	.07
Phosphoric acid.....	.03
Alumina, with a little oxide of iron.....	.45
Water, soda, undetected matter, and loss.....	.81
100.00	

Shells make an excellent flux for small charcoal furnaces; but their use in large anthracite furnaces has been objected to because of their alleged tendency to pack and measurably obstruct the ascent of the gases.

Anthracite.—This fuel is by no means constant in composition. Much of it is impure, being variously intermixed with slate and shale, and affording sometimes nearly twenty per cent. of ash. All of the ash must be fluxed and brought to the condition of fluid slag, and consequently each one per cent. of it will require the addition of more than one and a half per cent. of limestone, and for each one per cent. of slag there must be consumed more than a half of one per cent. of fuel.

Twenty-four fair samples of good anthracite from the Schuylkill, Lehigh and Susquehanna regions, were analyzed, with the following average results:

Moisture.....	1.34
Volatile combustible matter.....	3.45
Ash.....	4.16
Fixed carbon.....	91.05
100.00	

There was included in the above:

Sulphur.....	.240
Phosphorus.....	.013
Coke.—This is destined to be the leading fuel in the metallurgy of iron and steel. A sample, composed of forty-nine different pieces, from the neighborhood of Connellsville, Pa., gave, upon analysis, the following result:	

Moisture.....	.490
Ash.....	11.332
Sulphur.....	.603
Phosphoric acid (phosphorus .013).....	.029
Carbon by difference.....	87.456
100.000	

The ash of this coke gave:	
Silica.....	47.90
Alumina.....	47.76
Sesquioxide of iron.....	1.48
Lime.....	1.48
Magnesia.....	.53
Sulphur.....	trace
Phosphoric acid (phosphorus .09).....	.21
Potash and soda.....	.49
Undetermined matter and loss.....	.20
100.00	

Some analyses of the ash of anthracite showed very nearly the same composition.

Connellsville coke is hard, has a good metallic ring when struck, bears much handling without breaking, and does not materially deteriorate by keeping. It is given as a standard whereby the value of other coals may be ascertained.

The majority of coals produced are not so good as the Connellsville. Many contain more than fifteen per cent. of ash, and from one to two per cent. of sulphur, though there are some with less than three per cent. of ash and one-tenth of one per cent. of sulphur. A coke will always lose more or less sulphur by keeping—the substance volatilizes.

Slags or Cinders.—Make an average sample by selecting some of several tapplings.

The following may be taken as about the composition of a slag that ought to be produced with fair foundry iron (anthracite):

Silica.....	39.60
Alumina.....	15.76
Magnesia.....	5.06
Lime.....	37.29
Sulphur.....	.41
Phosphorus.....	trace
Manganese.....	trace
Potash and soda.....	1.23
Loss.....	.45
100.00	

* The relative proportions of magnesia, lime, alumina and manganese may vary considerably, because these substances are usually rejected each other.

Slags produced by furnaces using charcoal contain more or less potash, due to the ash of the fuel.

When a properly constructed and well appointed furnace works badly, the cause is due usually to an improper admixture of the raw material used. Whether or not this is the case may be readily ascertained by a reliable chemical analysis of the slag, which will show what substances are wanting, and what are in excess. Such an analysis should never be neglected.

Phosphorus in appreciable quantity is not usually found in normal slags of blast furnaces. The substance has such an affinity for iron that nearly all that is native in the ore will afterward be found in the pig. But such is not the case with sulphur. A large portion of that substance may be expelled by roasting the ore. Another portion becomes volatilized in the furnace; and still a larger portion may be fluxed out by judiciously using limestone rich in lime. Too much faith should not be placed in the notion that sulphur and phosphorus always largely neutralize each other, for iron may be both red and cold short from excess of the two.

It takes about .50 of phosphorus, that is, one half of one per cent., to make an ordinary commercial bar of iron perceptibly cold short; but less than a third of this quantity of sulphur may give the red short quality in a marked degree.

Pig Irons.—These are more variable in their composition than is generally supposed. A difference may exist between the bottom and top of a pig. Castings from the same raw material will sometimes materially differ, owing to the mode of mixing the ores, charging, and the temperature of the furnace. A high temperature is favorable to the formation of graphite carbon in the iron; at a very low temperature gray iron cannot ordinarily be made. As the per cent. of graphite changes, so will that of the silicon change more or less, though this law does not hold when the iron is made white by using chill molds. The differences may be material, although not readily discoverable by the eye; therefore, to secure a proper sample for analysis, pieces should be broken from several pigs of the lot. If the iron be gray and soft, the better plan is to bore or drill it, catching the fine particles on clean white paper, and then mix the several parcels in equal portions together, being very careful in the process to protect from all dust or dirt and moisture. A couple of ounces of the mixture will be sufficient.

Some pig iron made at the Glamorgan Furnace, at Lewistown, Pa., with equal portions of hematite and fossil ores, anthracite being the fuel, was found to be of the following composition:

Pure iron.....	95.49
Graphitic carbon.....	3.43
Silicon.....	2.15
Calcium.....	.07
Phosphorus.....	.39
Sulphur.....	trace
Combined carbon and loss.....	.36
100.00	

The metal was coarse grained and soft, classed as strictly gray No. 1 Foundry, and brought at Pittsburgh the highest price then ruling. It may be taken as a good type of its class.

A pig iron of the following composition was found well adapted for making Bessemer steel:

Graphitic carbon.....	3.36
Combined carbon.....	.36
Silicon.....	2.46
Manganese.....	1.28
Calcium.....	.07
Sulphur.....	trace
Phosphorus.....	.06
Pure iron.....	91.79
Undetected matter and loss.....	.06
100.00	

Gray pig irons of ordinary fair grade contain upon an average 6.50 of foreign matter, composed chiefly of carbon, silicon, manganese and calcium, with more or less sulphur and phosphorus. White irons and spiegeles are more variable, and contain from 2.50 to 20 per cent. of foreign matter. An excess of sulphur always tends to make pig iron white. The spiegeles are rich in manganese and combined carbon. The average loss of iron in slag will scarcely exceed, or perhaps reach, 3.50 of the pig metal produced; hence in the general working there is always a gain upon the raw material, and more pig is obtained than there is pure iron in the ore; though this fact is not usually made apparent by an analysis of the ore only, because of the common practice above mentioned of furnace men selecting for chemical investigation better material than is in the general working put into the furnace, a practice which has done and is doing a great deal of serious mischief.

The three following rules are given for guidance in blast furnace management:

First.—Allow no material to be put into the furnace, the composition of which you are ignorant.

Second.—Ascertain the composition of all stock at your command.

Third.—Ascertain from time to time the composition of each grade of pig metal the furnace produces.

The importance of a proper adherence to these rules must be obvious. A neglect of them may cause, as it has caused but too frequently, the chilling or unsatisfactory working of the furnace, or the continued use of a poor limestone, or of an ore or fuel bad because of associated injurious matter, when other stock every way suitable to be used either as a mixture or alone, is at command, and may be quite near by and neglected. A knowledge of the constituents of the pig metal will indicate what raw material should be used, and the manner of its use, and also inform as to what purposes the metal is best adapted, and therefore, to whom it may be most advantageously sold.

Science is now far in advance of practice in the metallurgy of iron; and no more serious mistake can be made by the ironmaster than to refuse or neglect to call to his aid the manifold benefits that chemistry affords. A few hundred dollars judiciously expended yearly in reliable chemical analyses, may save from ruin, and can not but add thousands to the profits of any modern high class furnace.

J. BLONDET BRITTON,
IRONMASTERS' LABORATORY,
No. 339 Walnut Street, Philadelphia.

* As a flux, good normal furnace slag, with a little limestone or oyster shells, may be used sometimes with great advantage.

Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, June 25, 1874.

The settlement of the currency question has been beneficial to business in Wall street. Money has been easy throughout the week at 2 @ 3 per cent. for call loans, while prime commercial paper has been salable at 5 @ 5 1/2 per cent.

Gold has strengthened up steadily during the week, and closes at about 111 1/2 per cent. The range of quotations for the week has been as follows:

	Highest.	Lowest.
Thursday	111 1/2	111
Friday	111 1/2	111
Saturday	111 1/2	111
Monday	111 1/2	111
Tuesday	111 1/2	111
Wednesday	111 1/2	111

The stock market was weak during the early part of the week, but strengthened toward the close, and a brisk advance occurred on many of the leading shares. The dealings during the week were in Lake Shore, Telegraph, Pacific Mail, Wabash, Union Pacific, Northwest and Erie. The highest and lowest quotations at the close of business to-day are given below.

Governments were easy early in the week, but are strong at the close. State securities have been dull, and are mostly nominal.

Railroad mortgages are firm at the close, but shared in the general depression early in the week.

The last bank statement shows a reduction in loans of \$3,175,300, a decrease in specie of \$1,930,800, a gain of \$887,600 in legal tenders, and a loss in deposits of \$5,102,900. The total reserve has fallen \$1,039,200, while the total liabilities have been reduced \$5,122,400. The banks now hold in lawful money \$18,204,850 above \$151,400 more than as held last week. The following is a comparison of the averages of the past two weeks:

	June 13.	June 30.	Differences.
Loans	\$281,242,800	\$279,067,500	Dec. \$2,175,300
Specie	\$1,921,000	\$1,934,300	Dec. 1,086,800
Legal Tenders	\$6,951,000	\$6,838,600	Inc. 887,600
Deposits	\$23,722,400	\$23,619,500	Dec. 5,102,900
Circulation	\$6,671,800	\$6,652,300	Dec. 19,500

The following tables show the foreign trade movements for the week:

	IMPORTS.		
	1873.	1873.	1874.
Total for week...	\$7,918,893	\$5,790,952	\$6,854,641
Prev. reported..	210,918,985	198,864,823	197,652,369

Since Jan. 1... \$218,857,863 \$204,655,775 \$304,507,010

Included in the imports of general merchandise for the week are:

	Quant.	Value.
Anvils	70	\$30
Brass goods	17	1,343
Bronzes	10	2,892
Chains and anchors	64	4,718
Copper	10	10,619
Cutlery	74	24,359
Guns	30	5,414
Gun barrel moulds	60	1,685
Hardware	82	11,494
Iron pig, tons	623	15,725
" sheets, tons	136	27,529
" R. & B. bars	17,221	350,162
" other tons	164	10,512
Metal goods	237	21,514
Needles	13	6,552
Old metal	450	
Platina	1	2,410
Saddlery	38	3,383
Steel	38	36,380
Spelter	265,851	18,790
Tin boxes	18,388	140,782
Tin, bbls.	15	1,081
Tin, 1851 slabs	70,911	14,957
Wire	653	7,983
Zinc	453,410	32,364

EXPORTS EXCLUSIVE OF SPECIE.			
	1872.	1873.	1874.
For the week...	\$4,395,843	\$5,728,915	\$6,429,678
Prev. reported...	97,437,497	122,912,005	131,351,354

Since Jan 1....	\$101,833,340	\$134,640,920	\$137,781,093
EXPORTS OF SPECIE.			
Total for the week.....			\$1,721,156
Previously reported.....			94,934,044

	1873.	1874.
Total for the week	\$1,731,038	\$1,731,038
Previously reported	\$4,394,946	\$4,394,946

Total since January 1, 1874... \$36,656,102

" " 1873... \$2,683,580

The following is the text of the new currency bill, signed by the President on Tuesday:

Sec. 1. The act entitled "an act to provide a National currency, secured by a pledge of United States bonds, and to provide for the circulation and redemption thereof, approved June 3, 1861," shall be hereafter known as the National Bank Act.

Sec. 2. That section 3 of the National Bank Act, be so amended that the several associations therein provided for, shall not hereafter be required to keep on hand any amount of money whatever, by reason of the amount of their respective circulations; but the moneys required by said section to be kept at all times on hand, shall be determined by the amount of deposits in all respects as provided for in the said section.

Sec. 3. That every association organized or to be organized under the provisions of the said act, and of the several acts amendatory thereof, shall at all times keep and have on deposit in the Treasury of the United States, in lawful money of the United States, a sum equal to five per cent. of the circulation, to be held and used for the redemption of such circulation, which sum shall be counted as a part of its lawful reserve, as provided in section 3 of this act; and when the circulating notes of any such associations, assorted or unassorted, shall be presented for redemption in sums of \$1000, or any multiple thereof, to the Treasurer of the United States, the same shall be redeemed in United States notes. All notes so redeemed shall be charged by the Treasurer of the United States, to the respective associations issuing the same, and he shall notify them severally on the first day of each month or oftener, at his discretion, of the amount of such redemptions; and whenever such redemptions for any association shall amount to the sum of \$500, such association so notified, shall forthwith deposit with the Treasurer of the United States, a sum in United States notes, equal to the amount of its circulating notes so redeemed; and all notes of National banks, worn, defaced, mutilated or otherwise unfit for circulation, shall, when received by any assistant Treasurer, or at any designated depository of the United States, be forwarded to the Treasurer of the United States for redemption, as provided herein; and when such redemptions have been so reimbursed, the circulating notes so redeemed, shall be forwarded to the respective associations by which they were issued; but if any such notes are worn, mutilated, defaced, or rendered otherwise unfit for use, they shall be forwarded to the Controller of the Currency, and destroyed and replaced as now provided by law. Provided, that each of said associations shall reimburse to the Treasury the charges for transportation and the costs for assorting such notes, and the associations hereafter organized shall also severally reimburse to the Treasury the

cost of engraving such plates as shall be ordered by each association respectively, and the amount assessed upon each association, shall be in proportion to the circulation redeemed, and be charged to the fund on deposit with the Treasurer; and, provided further, that so much of section 32 of said National Bank Act requiring or permitting the redemption of its circulating notes elsewhere than at its own counter, except as provided for in this section, is hereby repealed.

Sec. 4. That any association organized under this act, or any of the acts of which this is an amendment, desiring to withdraw its circulating notes, in whole or in part, may, upon the deposit of lawful money with the Treasurer of the United States, in sums of not less than \$5000, take up the bonds which said association has on deposit with the Treasurer for the security of such circulating notes, which bonds shall be assigned to the bank in the manner specified in the 19th section of the National Bank Act; and the outstanding notes of said association, to an amount equal to the legal tender notes deposited, shall be redeemed at the Treasury of the United States, and destroyed, as now provided by law; provided that the amount of the bonds on deposit for circulation shall not be reduced below \$50,000.

Sec. 5. That the Controller of the Currency shall, under such rules and regulations as the Secretary of the Treasury may prescribe, cause the charter members of the association to be printed upon all National bank notes which may be hereafter issued by him.

Sec. 6. That the amount of United States notes outstanding, and to be issued as a part of the circulating medium, shall not exceed the sum of \$382,000,000, which said sum shall appear in each monthly statement of the public debt, and no part thereof shall be held or used as a reserve.

Sec. 7. That so much of the act entitled, "An act to provide for the redemption of the three per centum temporary loan certificates and for an increase of national bank notes" as provides that no circulation shall be withdrawn under the provisions of section 6, of said act, until after the \$54,000,000 granted in Section 1, of said act, shall have been taken up, is hereby repealed; and it shall be the duty of the Controller of the Currency, under the direction of the Secretary of the Treasury, to proceed forthwith, and he is hereby authorized and required, from time to time, as application shall be duly made therefor, and until the full amount of the \$54,000,000 shall be withdrawn, to make a requisition on each of the national banks described in said section, and in the manner therein provided, organized in States having an excess of circulation, to withdraw and return so much of this circulation, as by said act, may be apportioned to be withdrawn from them, or in lieu thereof, to deposit in the Treasury of the United States lawful money sufficient to redeem such circulation, and upon the return of the circulation required, or the deposit of lawful money, as herein provided, a proportionate amount of the bonds held to secure the circulation of such association, as shall make such return or deposit, shall be surrendered to it.

Sec. 8. That upon the failure of the National banks, upon which requisitions for circulation shall be made, or of any of them, to return the amount required, or to deposit in the Treasury lawful money to redeem the circulation required within 30 days, the Controller of the Currency shall at once sell, as provided in section 49 of the National Currency Act, approved June 3, 1864, bonds held to secure the redemption of the circulation of the association or associations which shall so fail, to an amount sufficient to redeem the circulation required of such association or associations, and with the proceeds which shall be deposited in the Treasury of the United States, so much of the circulation of said association or associations, shall be redeemed as will equal the amount required and not returned; and if there be any excess of proceeds over the amount required for such redemption, it shall be returned to the association or associations whose bonds shall have been sold; and it shall be the duty of the Treasurer, Assistant Treasurers, designated depositories, and National bank depositories of the United States, who shall be kept informed by the Controller of the Currency of such associations as shall fail to return circulation as required, to assort and return to the Treasurer for redemption, the notes of such associations as have failed or gone into voluntary liquidation for the purpose of winding up their affairs, or such as shall hereafter so fail or go into liquidation.

Sec. 9. That from and after the passage of this act it shall be lawful for the Controller of the Currency, and he is hereby ordered to issue circulating notes without delay as applications therefor are made, not to exceed the sum of \$55,000,000, to associations organized or to be organized in those States and Territories having less than their proportion of circulation under an apportionment made on the basis of population of each of said States and Territories at the census of 1870, and every association hereafter organized shall be subject to and governed by the rules, restrictions and limitations, and possess the rights, privileges and franchises now or hereafter to be prescribed by law as national banking associations, with the same power to amend, alter and repeal provided by the National Bank Act, provided that the whole amount of circulation withdrawn and removed from the banks transacting business shall not exceed \$55,000,000, and that such circulation shall be withdrawn and redeemed as shall be necessary to supply the circulation previously issued to the banks in those States having less than their apportionment; and provided further that not more than \$30,000,000 shall be withdrawn and redeemed as herein contemplated during the fiscal year ending June 30, 1875.

The title of the bill is amended to read as follows: "An Act to fix the amount of United States notes, provide for the redistribution of the National Bank Currency, and for other purposes."

GENERAL HARDWARE.

In Hardware circles matters are going on smoothly and without excitement. There is some business doing, but the attention of the trade is chiefly occupied with preparations for the coming season. We cannot yet form an idea of the number of changes in prices that may be expected next month. We know of some staple articles on which new prices have been decided on, to go into effect next month, but we are not at liberty to make them public now.

W. A. Ives & Co. have issued a circular in which they call attention to a change in the cutting arrangement of their well known Expansive Hollow Auger. As formerly constructed it was liable to clog. It is claimed that this difficulty is entirely overcome by the present arrangement of the cutter.

At a meeting of the Tack Manufacturers in Boston to-day (Wednesday) prices were materially reduced. The following is the new price list, from which it should be remembered an additional discount of 7 1/2 per cent. is to be taken.

Those prices which have been reduced are printed in heavy type, while those which remain unaltered are given in the usual figures. There are no advances.

HARDWARE LIST.
TACKS—LIST PRICE.
Oz. 1 1/2 2 3/4 4 6 8 10 12 14 16 18 20 22 24
Cts. per M. 7 7 7 8 9 10 12 14 16 18 20 22 24 26 30
COM. AND PAT. BRADS—LIST PRICE.
In. 1 1 1/2 2 2 1/2 3 3 1/2 4 4 1/2 5 5 1/2 6 6 1/2 7 7 1/2 8 8 1/2 9 9 1/2 10 10 1/2 11 11 1/2 12 12 1/2 13 13 1/2 14 14 1/2 15 15 1/2 16 16 1/2 17 17 1/2 18 18 1/2 19 19 1/2 20 20 1/2 21 21 1/2 22 22 1/2 23 23 1/2 24 24 1/2 25 25 1/2 26 26 1/2 27 27 1/2 28 28 1/2 29 29 1/2 30 30 1/2 31 31 1/2 32 32 1/2 33 33 1/2 34 34 1/2 35 35 1/2 36 36 1/2 37 37 1/2 38 38 1/2 39 39 1/2 40 40 1/2 41 41 1/2 42 42 1/2 43 43 1/2 44 44 1/2 45 45 1/2 46 46 1/2 47 47 1/2 48 48 1/2 49 49 1/2 50 50 1/2 51 51 1/2 52 52 1/2 53 53 1/2 54 54 1/2 55 55 1/2 56 56 1/2 57 57 1/2 58 58 1/2 59 59 1/2 60 60 1/2 61 61 1/2 62 62 1/2 63 63 1/2 64 64 1/2 65 65 1/2 66 66 1/2 67 67 1/2 68 68 1/2 69 69 1/2 70 70 1/2 71 71 1/2 72 72 1/2 73 73 1/2 74 74 1/2 75 75 1/2 76 76 1/2 77 77 1/2 78 78 1/2 79 79 1/2 80 80 1/2 81 81 1/2 82 82 1/2 83 83 1/2 84 84 1/2 85 85 1/2 86 86 1/2 87 87 1/2 88 88 1/2 89 89 1/2 90 90 1/2 91 91 1/2 92 92 1/2 93 93 1/2 94 94 1/2 95 95 1/2 96 96 1/2 97 97 1/2 98 98 1/2 99 99 1/2 100 100 1/2 101 101 1/2 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OLD METALS, PAPER STOCK, &c.
The market for old metals, rags and paper stock still continues very dull, and we see of no prospect of business soon reviving. It is reported that dealers are selling their Old Metals at prices considerably less than their market value. Copper, Yellow Metal, Brass, heavy Composition and Lead have declined from 1 to 2 cents a pound. White linen rags are still in good demand. The purchasing prices offered by the dealers are as follows:—
Old M. (a/s).—Copper, 16c. @ 18c. per lb.; Yellow Metal, 11c.; Brass, 11c. @ 12c.; Composition,

last week that the great carrying companies had formally united in deciding on a shortened production of Coal in all the month of July, in order to prevent an over supply of Coal at the shipping points, and that the fact would be announced by general circular. These reports on inquiry are not verified. There is no doubt that more Coal at the mines ready for market than the orders on hand will cover, but it is not likely, as we understand that there will be any concerted suspension of production. July is always a dull month in Coal, and there are ways improvements to make on the lines of the carrying companies as well as at the mines, which offer temporary obstructions to active working, and occasion will probably be taken

PIG IRON.—Trade continues quiet, as it usually at this particular time, and the market presents but little that is new or important to which reference has not already been made.

balance sheets are made out that the last nine months have been more disastrous to profits than any other period of equal length since 1861, and we are inclined to hope that, such being the case, it will put a stop to the present policy of taking orders at any price, which seemingly has prevailed since last March. If it does, we congratulate the country on the selling price of Iron in the bar, and definite relation to its cost the mills will find themselves supplied with more work in the aggregate, and have, also, the cheerful knowledge that they are working for something else beside their interest accounts and glory. With present prices of metal, coal and labor, Retined Bars at 2 6-10 in large lots

Sand Iron, 1½ wide and upward.....	.4% to .5c.	64
Standard Iron from 1¼ to 4 in. wide.....	4 to 4½c.	
Good Shovel Iron ¾ to 1 in. wide by ½ to ¾ thick.....	4 to 5c.	65
Norway Nail Rods.....	7½ to 8½c.	66
Diamond Cast Steel, Flats, Squares and Oregon, ordinary sizes.....	16½c.	67
Machinery Steel.....	18c.	68
Cast Spring Steel.....	11c.	69
Homogeneous Steel Plate.....	13c.	70
Common Horse Shoes, per keg of 100 lbs.....	\$5.87½	71
Male Shoes.....	\$5.87½	
Utah Horse Nails, from 1½ to 13c., per pound.....	9 8 7 6 c.	
23 24 25 26 per lb.	10 9 8 7 6	
Globe Horse Nails.....	33 34 35 28c.	per lb.
R. spikes.....	5½ by 9-16 at 3¼c to 4c,	per lb.

FRANCE.

PARIS, June 7, 1914.—Copper.—The general European trade returns in this metal have proved favorable beyond expectation; especially in the case of the case in the case of England. The dwindling away of stocks has been very nearly imperceptible at the time during the past month, being in moderate quantities, not on all hands and most steady. It need not cause surprise, therefore, that the discovery of the altered position of Copper in Europe came so suddenly, when finally the statement was published. It is to be hoped now that the upward movement inaugurated in the metal may not overlap itself, for we fear much that too rapid an advance would check at once legitimate consumption, and thus eventually produce a serious recoil. We may here remark, with reference to the English smelting interest, that in 1913 the smelters in the United Kingdom were supplying their own requirements, and thus they accumulated during 1913, whereas up to the present period this year, with a so much lower range of prices, they have been supplying the public from new purchases made of the importers, but upon the average, and one of 3000 from last year, the decrease in stock, at least, being 4000 tons on the average, and 4746 on the year. The present gross total of stock and at least very nearly approaches that of June 1, 1913, while quotations are then 23s. 6d. per ton, higher, and whereas at that time there were large parcels of Copper on the way to England from India and Japan, which not only is not the case in the present instance, but England is now shipping to India in quantities sufficiently large to make an impression on the English market, while the movement lasts. The improvement in England to date is £1 per ton on Bars since the 1st inst. The Continental markets follow slowly the English course of prices, with a moderate conservative inquiry. We quote as follows: Paris—Chili Bars, deliverable at Havre, 193; Ordinary, 183; Ingots, 210; and pure Corcoro Ore, 202-30 francs. Havre—Chili Bars, 192-50 to 202; Refined Ingots, 210 to 215; pure Peruvian Ore, 197-50 to 202; old Copper, 185 to 190; old Yellow Metal, 120 to 130; Bronze, 160 to 170 francs. Marcellite—Spanish, in slabs, 200; Refined Ingots, 210; Copper Sheathing, 230; Yellow Metal ditto, 220 francs. Berlin—Swedish, 210 to 215; pure Peruvian Ore, 197-50 to 202; old Copper, 185 to 190; old Yellow Metal, 120 to 130; Bronze, 160 to 170 francs. Hamburg—Russian, Demidoff, 103 marks; Norwegian, 90 to 100; Refined Chili, 90 to 100; Yellow Metal Sheathing, 81; Copper ditto, 93; Swedish, 100; English and Chili, 29 to 30 shillings. Rotterdam—Drontheim, 50 to 53; Crown, 51. Amsterdam—English, 56 to 55 guilders. Tin.—We have again to resort to statistics of a more general European character in order to be able to give a more correct estimate of the actual position of the metal:

June 1.	Chili bars.	Stock, London and Havre.	Stock, London and Havre.
1913.	428,283	43,283	43,283
1914.	428,283	43,283	43,283
1915.	428,283	43,283	43,283
1916.	428,283	43,283	43,283
1917.	428,283	43,283	43,283
1918.	428,283	43,283	43,283
1919.	428,283	43,283	43,283
1920.	428,283	43,283	43,283
1921.	428,283	43,283	43,283
1922.	428,283	43,283	43,283
1923.	428,283	43,283	43,283
1924.	428,283	43,283	43,283
1925.	428,283	43,283	43,283
1926.	428,283	43,283	43,283
1927.	428,283	43,283	43,283
1928.	428,283	43,283	43,283
1929.	428,283	43,283	43,283
1930.	428,283	43,283	43,283
1931.	428,283	43,283	43,283
1932.	428,283	43,283	43,283
1933.	428,283	43,283	43,283
1934.	428,283	43,283	43,283
1935.	428,283	43,283	43,283
1936.	428,283	43,283	43,283
1937.	428,283	43,283	43,283
1938.	428,283	43,283	43,283
1939.	428,283	43,283	43,283
1940.	428,283	43,283	43,283
1941.	428,283	43,283	43,283
1942.	428,283	43,283	43,283
1943.	428,283	43,283	43,283
1944.	428,283	43,283	43,283
1945.	428,283	43,283	43,283
1946.	428,283	43,283	43,283
1947.	428,283	43,283	43,283
1948.	428,283	43,283	43,283
1949.	428,283	43,283	43,283
1950.	428,283	43,283	43,283

The foregoing goes to show that on the 1st inst. Chili Bars still stood £1.16 below the average of the past five years, 1874 included; that the stock showed a 1354 ton deficiency as compared with the average, and one of 3000 from last year, the decrease in stock, at least, being 4000 tons on the average, and 4746 on the year. The present gross total of stock and at least very nearly approaches that of June 1, 1913, while quotations are then 23s. 6d. per ton, higher, and whereas at that time there were large parcels of Copper on the way to England from India and Japan, which not only is not the case in the present instance, but England is now shipping to India in quantities sufficiently large to make an impression on the English market, while the movement lasts. The improvement in England to date is £1 per ton on Bars since the 1st inst. The Continental markets follow slowly the English course of prices, with a moderate conservative inquiry. We quote as follows: Paris—Chili Bars, deliverable at Havre, 193; Ordinary, 183; Ingots, 210; and pure Corcoro Ore, 202-30 francs. Havre—Chili Bars, 192-50 to 202; Refined Ingots, 210 to 215; pure Peruvian Ore, 197-50 to 202; old Copper, 185 to 190; old Yellow Metal, 120 to 130; Bronze, 160 to 170 francs. Marcellite—Spanish, in slabs, 200; Refined Ingots, 210; Copper Sheathing, 230; Yellow Metal ditto, 220 francs. Berlin—Swedish, 210 to 215; pure Peruvian Ore, 197-50 to 202; old Copper, 185 to 190; old Yellow Metal, 120 to 130; Bronze, 160 to 170 francs. Hamburg—Russian, Demidoff, 103 marks; Norwegian, 90 to 100; Refined Chili, 90 to 100; Yellow Metal Sheathing, 81; Copper ditto, 93; Swedish, 100; English and Chili, 29 to 30 shillings. Rotterdam—Drontheim, 50 to 53; Crown, 51. Amsterdam—English, 56 to 55 guilders. Tin.—We have again to resort to statistics of a more general European character in order to be able to give a more correct estimate of the actual position of the metal:

June 1st.	1874.	1875.	1876.
London.	2,388	1,960	1,836
Banca in Holland (in second hands).	873	1,530	1,476
Billion there.	1,065	235	190
Strait's afloat for Europe.	262	535	1,639
Billion.	699	495	400
Australian.	536	114	93
	5,818	5,000	5,684

From what precedes it will be seen that the London stock, though it has decreased 103 tons during May, is still large, that the Banca supply in Holland in dealers' hands is still quite moderate, a though it increased 630 tons in May, that the Billion stock in England is still extensive, and that a fair supply is on the way from Australia, though lessened by some 500 tons during the month. To the foregoing there have to be added:

HELD UNOBTAIN BY THE DUTCH TRADING CO.	1874.	1875.	1876.
June 1st.	2,786	3,116	734
Afloat for Hand.	702	915	500
	3,488	4,031	1,234

The tone which has prevailed in the London Tin market in general, and the English and Dutch in particular has been one of business, devoid of excitement, it since the stock which has been placed in the close of last month, the tendency being a gradually upward one, based altogether upon a growing demand for consumption in Holland, and not on the preceding statistics, which show a visible supply between England and Holland of 9,000 tons, against 9124 and 6618 in 1874 and 1875. The following are the Continental quotations, aside from Holland, the markets being steady, on the whole, without overmuch doing: Marcellite, Straits, 265 francs; English, 270. Paris, Banca deliverable at Havre, 183; Straits, 265; English, at either Havre or Rouen, 267½. Havre, Straits, 260 to 265; Berlin, Banca, 26½ to 26½; English, 24½ to 25 shillings. Hamburg, Banca, 1½ marks; English, 1½; M. H., 1½. London, a good deal of animation is observable in the metal, both in England and on the Continent. If we are to believe the assurances of the London Times, rich lead mines are about to be developed in the county of Aberdein, in Northeast Scotland, nine miles from Balmoral, in the Buller Mountains. A vein rich in galena had been discovered 2 feet 6 inches in thickness, intercepted by a rock, evidently rolled down on it from a neighboring hill. In following up in this direction a continuation of the deposits has been discovered, the vein being 10 feet below the surface. The course of prices on the Continent has been a slowly hardening one, and we quote them as follows: Paris, 53 francs; Havre, 50 to 51; Marcellite, 47½ to 48; Berlin, 54 to 55; Hamburg, 2½ to 2½; Straits, 26½ to 26½; Amsterdam, 50 to 51; Rotterdam, 50 to 51. Iron.—The general outlook in France is a decidedly improved one, especially as regards rails, while wrought iron is less inquired for; the former, 2-30 francs could be found for, for we think, at present. Coal is firm without any change in value.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

SHEFFIELD, Eng., June 8, 1914.

THE TRADE OUTLOOK

is not, by any means, brighter than when I had last the privilege of staining paper on your account. It is very difficult to balance the many and weighty pros and cons which can be put forward by parties holding opposite views as to the length of time the present depression will last, and it is a still more trying task to analyze the causes which may, nay, must, lead to a given effect in either one or the other direction. It is urged, and not without reason, that we as a nation cannot stand still, that we must go forward in all material works in order to provide for our growing prosperity and heightened civilization, and that therefore the iron trade, as our most important material industry, cannot long remain under a cloud. I will not do myself the injustice of stating that I altogether endorse this opinion, there being, as a matter of strict fact, a good deal to be said

on the other side of the question. For instance, it is put forward as an undoubted circumstance that the world is now able to look to several sources for its supply of iron other than our own manufacturers, who formerly had a virtual monopoly of it, and that, therefore, buyers have alternate courses open to them, which they very naturally manipulate so as to bring about a keen competition with an attendant drop in prices. If one cannot sell at the buyer's ideal price another may, hence, if Great Britain's figures are too high, which happens to be the case just now, she must kindly wait in enforced divorce from customers until she is able to meet them upon a footing which is not above her competitors. How she effects the drop is a matter of little consequence to the buyer. He is perfectly indifferent to everything but the one result in which he is interested, which is to buy at the lowest possible rate. If, in principle, carried out, he will, without orders for all but absolutely necessary goods, and either wait for the fall or waive the requirement entirely. That is one item of the indictment—the others are those which concern the internal arrangements of the British iron trade, and therefore need not be dwelt upon. One thing, at least, I think we may accept as very clear, and that is that the consumer in any part of the world owes no such thing as gratitude either to Great Britain or her manufacturers. With him the question has been, is, will be, the purely commercial one of buying cheaply; and if Great Britain cannot supply him he will transfer his support to those who can, whether they be Belgium, French, American or German manufacturers. To talk, as some British papers weekly do, of "gratitude" and all the rest of the sentimental side of the matter, is simply rubbish. There isn't much "gratitude" in the world, and in business there is absolutely none at all. There, it is the all powerful law of supply and demand. The consumer doesn't care a tinker for the producer unless he thinks he is being supplied as cheaply as his neighbor. Let us now see what our worthy newspaper friend, the Economist thinks. In dealing with

POSSIBILITIES OF THE IRON TRADE FUTURE, the Economist thinks that "a gradual reduction in prices will soon bring back good trade. The extreme rise, so long as there was a full demand for the articles produced, implied a rate of wages and profits in the trade disproportionate to the ruling rates in other trades, allowing for all the differences of risk, disagreeable character of the labor, and the like. Consequently, both capitalists and laborers will probably be satisfied in the long run with lower wages and profits than the extreme rates which tempted them into the trade, so long as these wages and profits are not disproportionately low compared with other trades. There is a large margin for a fall without constituting such a condition of things as will induce capital and labor to forsake the trade either quickly or by degrees. There is yet another reason why a further fall should be anticipated in the continued temptation to labor to come into the trade while a regime of high prices is maintained. If existing workmen in the trades decline reduced wages, there is still a certain quantity of labor to which these wages are attractive, and the entire producing capacity is consequently increased. If the case were that of capitalists standing out for unduly high profits, the effect would be precisely the same. The maintenance of the regime of high prices would attract new capital, and the excess of producing capacity over consumption, which is the cause of the would be increased. The same cause which made it so safe to predict that the famine prices of coal and iron would not be of long continuance, but would assist a general depression in trade, check consumption, and, finally, lead to a heavy fall, operate over the whole period while the fall is in progress. No conceivable amount of resistance by the producers can long arrest a decline, unless capital and labor abandon the trade altogether. Any artificial means of keeping up the price, such as a reduction of the output, only nourish and strengthen the causes which produce the decline. It follows from this account of the present check to the fall in coal and iron, that at a certain level a very good trade may spring up. What that level exactly is, whether the price at which coal and iron stood before the recent inflation began, or a somewhat higher price, cannot be determined easily beforehand; but there is plainly a large demand in the suspense which will become active at a lower price. All the reports from the iron districts refer to orders which are kept back because of the high price, and many departments of the trade are also such that, from their nature, the demand must be of the most varying kind, and be greatly influenced by price. The products of the iron and coal trades are largely used in the creation of fixed capital—the construction of new railways, and structures of every sort, or additions to old undertakings. A demand for such purposes is of a very optional character. Unless the price suits, and gives sufficient promise of profit, new undertakings which would otherwise be made will be kept back, and the capital which might be used in them will accumulate in the banks and depress the rate for money. This is all the more likely to be the case because many of the undertakings are the projects of speculators who propose to construct them with borrowed money, and to whom a slight difference of cost on account of the risks run and their inability to hold may be all important. Hence to a large extent the great diminution of consumption which has paralyzed the iron and coal trades, and which makes the resistance of the workmen to the reductions of which notice has been given the more difficult; but hence also will come the recovery of the trade at a proper level of prices. The optional demand is quite certain to become effective at some point or other, and it may quickly equal the producing capacity of the world just because of the large amount of capital now seeking investment, and which, for want of better employment, will directly or indirectly be available for new works. To all appearance the present contest may go on for some time until the workmen have exhausted the small surplus remaining in their hands after the recent inflation, but the subsequent recovery will probably be very rapid."

This would appear to be a dispassionate view of the question, but despite its unquestionable probability, I think we must at present deem it a mere speculation.

THE SCOTCH PIG IRON MARKET is still in a very peculiar state, of which certain keen speculators have not failed to take advantage during the past week, and have made a very plucky attempt to rig the market. As a consequence of this speculation warrants went up steadily during the whole of last week until Friday afternoon, when there was a pause, and from 15 to 16.6 (the highest point reached during the period named), prices softened down to 15.6, probably in consequence of the cessation of the fictitious demand. Legitimate business is necessarily confined within very narrow limits, the production being very small, and prices of several makers' brands wholly nominal. Shipments are still on a low scale.

Writing on June 2d, Messrs. Wm. Colvin & Co. (Glasgow) remarks: "The state of the trade may justly be described as deplorable in the extreme, and the advance in price does not arise from any improvement in the demand, but is caused by speculation acting on a small stock and a diminished production."

"It is rumored that several furnaces are to be put in blast this week, and it is much to be desired that things may gradually assume a more natural aspect, as the present anomalous state of matters only tends to increase the prevailing depression and render a continuance of low prices and reduced wages the more probable."

Messrs. James Watson & Co's. Glasgow weekly report, of June 5th, says: "No change to report in the position of the Labor question. Masters and men are as obstinate as ever, iron therefore gets daily scarcer, warrants dealt in from 90 to 95.3 closing to-day at 93.6. We are still unable to quote for makers' iron. Shipments last week were 7016 tons against 16,880 tons in the corresponding week of 1873."

There are now only 26 furnaces in blast in Scotland as against 123 at the same period of 1873. Freight from Glasgow and Ardrossan to New York continue at 8, and from the East Coast 5. To Boston from Glasgow and Ardrossan 18 and East Coast 12.6. To Baltimore 17, 16 and 14 respectively. To New Orleans 20, 20 and 9. Total shipments this year 184,538 tons, a decrease comparatively since Christmas of 104,669 tons.

THE SHEFFIELD TRADES.

There is very little animation in any one branch of trade after the holidays. Most of the works resumed on Monday or Tuesday, the interim having been utilized in repairs and renewals.

A moderate amount is being transacted in ironstone and ores, the former from Northamptonshire and Lincolnshire, and the latter from Whitehaven and as imported from Spain, Algeria and Elba.

Hematite ores are unchanged in price, and Bessemer hematite pig iron is—No. 1, £3; No. 2, £2.17.6; and No. 3, £2.15; ordinary No. 3, £2.10; No. 4, £2.10; No. 5, £2.10; m., £2.10; and w., £2.10. Cleveland pig is firmly held by agents. Scotch pig cannot be had at any price by founders, who prefer it when obtainable to their credit.

The iron and steel works are only about half employed, there being very few new specifications of any weight in the market for rails or other railroad materials.

There is but an indifferent inquiry for cast steel, except for the very best quality for Germany and America, or the home market.

Files, saws and edge tools are in fairly good but not active request, chiefly in the last case for Australia, India and the Cape. The question of the miners' wages in South Yorkshire and Derbyshire can hardly be regarded as settled even yet. On Thursday last the adjourned meeting of the district colliery owners was held at Barnsley to receive the reply of the miners as to the proposed reduction of 12½ per cent. in their wages. Mr. Stewart, Lundhi 1, again presided. Messrs. J. Normansell and Casey, secretaries, with a deputation, attended and explained the decision to which the men had come. After some discussion it was agreed that the men should be asked to accept a drop of 10 per cent. on the gross earnings, to take effect from May 20, as previously arranged, and that they be asked to accept a reduction of a like amount for a period of two months, afterward to agree to whatever drop may be awarded by Mr. Rupert Kettle as arbitrator in the case of the West Yorkshire miners. Some of the delegates are understood to have stated that they considered this proposition a reasonable one. The deputation, on the part of the Miners' Association, promised their final reply on Monday. The same evening a mass meeting of some 3000 miners was held at Barnsley, at which the officials of the association were censured in no measured terms; but after a good deal of rapid speaking the meeting dissolved without any practical resolution being arrived at. On the Monday a largely attended meeting of delegates from the various lodges of the Miners' Association was held at Barnsley, at which the resolution of the employers was somewhat feelingly canvassed. It was ultimately decided to adhere to the resolution passed on May 23d, to submit to a reduction of 10 per cent. from the 5½ per cent. given since 1871. A copy of this resolution was sent to the secretary of the Coal-owners' Association on Tuesday, and also to the members. I may state that at the meeting about 24,000 miners were represented, and that it is deemed highly probable that in many cases the men will be locked out by the masters. If this unfortunate contingency should arise, it will be a matter for much regret, and will be in direct opposition to the advice prudently and wisely given to the men by the secretaries of their union, Messrs. Normansell and Casey. These gentlemen have, in fact, done all they could to avoid a dispute, a circumstance not a little to their credit.

On Monday, at Leeds, an adjourned meeting was held of the creditors of Messrs. Tyer, Middleton & Co., Hunslet Iron Works, Leeds. The liabilities of the firm were stated to be over £100,000, with assets as a going concern of equal amount. It was stated that the firm had been unfortunate with respect to certain of its mechanical appliances, and that trade disputes and other unusual matters have disturbed the ordinary working arrangements of the concern. It was unanimously resolved to wind up the estate by liquidation in bankruptcy.

It is understood that at the meeting of the Yorkshire Engine Company, held on Monday, there was no dividend declared, owing to there having been a protracted strike of the workmen during last year. It is, however, stated that the company has now several good orders on its books.

On Friday a further meeting of the shareholders of the Albion Steel and Iron Works, limited, Sheffield, was held, at which it was stated that about £21,000 worth of debentures had been taken up.

It has been expected that this week would have brought a reduction in the price of coal, but up to the time of writing no such has been announced. In the Dronfield district of North Derbyshire the coke producers have reduced the price of hard coke by 2/6 per ton, making it 25/ for that quantity. Very little coal can be got by the local merchants; consequently, they have no difficulty in disposing of that which reaches them. A merchant doing a good business informs me that from one really large pit for which he sells he has had about four wagons in a fortnight. The men are not working well, and it is hardly the interest of the owners to ask them to do so.

It will be gathered from the nature and tenor of the foregoing observations that trade news is absolutely and decidedly at a great disadvantage; the matter of most moment, seeing that it effects all the Sheffield trades, is the miners' wages question. Should it be peacefully settled I shall expect to hear of a drop in the price of common steel. Speaking of steel reminds me that several of the Sheffield manufacturers have received letters from their New York agents, stating that the committee appointed by Congress to examine into the question of duties, have decided to recommend a return to specific duties, with a charge of two cents per lb. upon all kinds of steel without distinction. The Sheffield Independent says: "This is the very thing the steel manufacturers desire, but it is not probable that it will come into operation, even if agreed to, before the next session of Congress." Whether this is so or not you have much better opportunities of knowing than myself, and I shall, therefore, leave the subject without further comment.

There is little novelty in cutlery. Few of the factors and merchants are doing a business which commands their whole attention, and of the total, America does not contribute more than a

very slight quota. There is a quiet demand for best ivory table cutlery and carvers, but common descriptions are not inquired for to any appreciable extent. Spain, the Indies, Africa and South America are taking small and mixed lots of goods, but, on the whole, the trade remains quiet and little changed.

BIRMINGHAM AND DISTRICT.

The hardware trades of Birmingham and its satellite hardware towns are very quiet. The home trade is now the mainstay of many branches, particularly for Britannia metal and electro-plated goods, tools, brass-foundry and japanned ware. The demand from Japan is stated to be pretty good for heavy hardware, iron sheets, fancy goods and tools; from India for edge tools and machinery, and from one or two other distant markets for tools and miscellaneous hardware. In the last, German competition is much felt in several classes of goods. From the United States it is stated that there are a few specifications for special brands of iron hoops for cotton ties, curly combs (which, last week stated, were 2½ per cent. lower), steel ware and guns for birding. The engineers and machinists are still well employed on steam-pumps for mining and other similar purposes, engines for threshing and other agricultural purposes, and sugar mills for Eastern Europe and Egypt. There is a fair inquiry for plantation hoes, matchets and some other collateral goods for India and South America. The steel pen manufacturers are taxed to the utmost capacity to fill orders, and the makers of iron tools, and makers of railway rolling-stock. There is a slight improvement in the inquiry for sheet iron goods, buckets, scoops and the like, consequent upon the drop in prices of 5 per cent., but as stocks are very large the effect upon the makers is not yet visible. The lamp trade is not very buoyant, but there is a fairly sustained inquiry for carriage lamps. For brass hinges, brass locks and window fastenings the demand is particularly brisk just at present. The locomotive tube producers are fairly busy, as also are the metal rollers.

A local correspondent mentions a new phase of American competition in these terms: "America, which has already become a strong competitor with England's customers in the iron trade, is now competing with Birmingham in one of its own special manufactures, that of jewelry, especially cheap goods, consisting of alberts, solitaires, and other articles. The jewelry is gold-plated, and has the exact appearance of the real metal, while it stands the test like the real metal. The patterns, too, are artistic in design, and differ from that of the English jewelry. The workmanship is characterized by the greatest finish, the links being closed by hydraulic pressure, and the article produced is both ornamental and durable. In the matter of cost the American jewelry is considerably cheaper than that made in this country."

There is a little better demand for some kinds of iron in South Staffordshire since the holidays, mainly for the home market, but no alteration in prices with the exception of the drop of bars to £12, by Messrs. Philip Williams & Sons. Some descriptions of sheets are reported to be a trifle firmer, mainly owing to the price and scarcity of coal, consequent upon the continued strike of South Staffordshire miners. Quotations are now, bars £10 to £12 (except Lord Dudley's and Messrs. Barrows) £13 to £14 for sheets, £11 to £12 for nail rods and £12 to £13 for hoops. In no description is there much business doing, foreign and colonial specifications being almost wholly absent or of excessively small calibre.

THE SOUTH WALES IRON AND TIN PLATE TRADES.

I am again unable to report anything of a satisfactory nature from the South Wales district. The colliers were, up to Saturday, in a most unsettled condition on the wages question, but I learn, by telegraph, that at many pits a settlement has been effected by the men agreeing to the drop of 10 per cent. Mr. Crawshaw evidently means severing all the old connections with a vengeance. In addition to what I have recorded in previous communications, he has given all his men notice that he will blow out every furnace, save one, thus depriving 3000 men of work, beside doing which he has given all his medical staff notice, so that henceforth the men must provide medical or surgical attendance for themselves, and at their own cost. It is also rumored that the Iron King intends to take the same steps with regard to the schools which he now supports, but I do not think this will be so, owing to the deep interest which I happen to know Mr. Crawshaw takes in them. The men have elected to let their engagements be of a business nature, as they are finding out to their cost, instead of the almost family connection which had always previously existed. The result is certainly to be regretted. The iron trade is not half employed, even with rails at £8, a price which does not leave a penny per ton profit, and in some cases involves a slight loss. A correspondent mentions that he has seen the scale of wages paid to the whole of the colliers of South Wales, as prepared by Mr. Dalziel, of Cardiff, secretary to the Coal-owners' Association. From this it appears that firemen in the Rhondda Valley get £130 a year, the colliers of Breidford-under-Dowls 72/ per week, and all the Dowlais colliers £3 per week, 9 per diem being the average of colliers wages in Wales, taking the mean between the highest and lowest, as respectively represented by the colliers who have 12/3 per diem, and those at Gilfach 7/6. Last week Cyfarthfa was singularly fertile in the way of fatal accidents, no less than six lives being lost in two days. In one instance, four men were attending to a blast furnace, when the breast of an adjoining furnace burst, enveloping them in fiery metal and flames. Two were so horribly roasted that their remains had to be baked out, and the other two afterward died. Next day an engineer and laborer were blasting out some slag from a furnace by means of dynamite, when an apparently missed shot exploded and blew both literally to pieces. At Llantriffril the boiler blew up, but, although there was much damage, no lives were lost. Tin plates are nominally unaltered, the strike being yet unsettled.

THE METAL TRADES.

Messrs. Von Dadelsson & North say: "Copper has at last attracted attention, for the large deliveries last month took every one by surprise. Nearly 3000 tons of various kinds of copper have changed hands this week. Chili bars have advanced from £73.10 to £77, cash, and £78 with prompt; Wallaroo, £87, buyers; B.m., £86.10. English copper is firmer also. Tin: We have to report a firm market, but only a moderate amount of business, through scarcity of sellers. Straits, £101; Banca, £104; Billiton, £98 to £99; Australian, £97. The Dutch market has advanced to £90 for Banca, and £98 for Billiton. English is without change. Tin plates: Not much doing; the lockout still continues, and there appears no prospect of a speedy settlement. Lead in moderate demand, but very firm; £21 the nearest price. Spelter quite neglected; prices nominal; nothing officially reported the last ten days. Quicksilver without change."

Messrs. French & Smith, June 4th, remark as to Tin: "The tone of the market was firm all May. The deliveries out of stock were good, both here and in Holland, together amounting to over 900 tons. This is large, as we have so many tin plate works closed. English is in good demand, with small stocks. The quantity of Australian shipped since our last monthly circular, is small. The Dutch Trading Com-

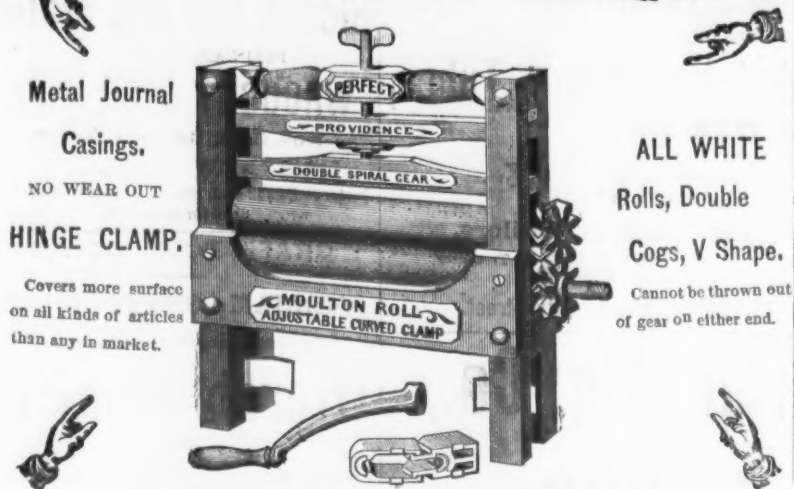
pany, held their bi-monthly sale on the 25th ult., when the quantity of r.d., 23,300 slabs, was sold at an average of 57½ guilders, and has, we believe, gone into strong hands. The price is now quoted 58½; firm; Billiton, 56½; Straits here, 100 to 101. The following is the state of the stocks on June 1, 1914: Foreign in London, including Australian (not ore) estimated at 2344 tons; Banca in Holland, warrants, 870 tons; Billiton in Holland, warrants, 970 tons; afloat for Europe, tin from the Straits, advised by mail and telegram, 290 tons; Billiton tin afloat from Holland, 720 tons; Banca in Trading Company's hands, unsold, 2790 tons; Banca floating, 720 tons; total, 8714 tons. Price of Straits tin, £100. Australian afloat as advised by letters: Tin ore, 283 tons; tin metal, 3.0 tons; metal, 510 tons. The arrivals during May were 422 tons."

Messrs. Sanford & Birds' prices current: "Metals.—Tin plates: The works in South Wales are still closed, with no immediate prospect of reopening; in the meantime business is restricted to pressing requirements, buyers preferring to wait until the works recommence, and matters are satisfactorily arranged between masters and men. Melyn charcoal, 38/; Afam, 36/; Cymro coke, 30/; best charcoal, 40/ to 42/; charcoal, 37/ to 38/; best coke, 35 to 36/; coke, 30/ to 32/; terms plates, 27 to 28/ per box; black plate, 24/ to 26/ per cwt.; charcoal tin sheets, up to 72x36, 46/ to 44/ per cwt.; coke do., 72x36, 38/ to 40/ per cwt.; decorated tin plates, 60/ per box; continuous terrace roofing, 80/ per keg of 200 feet by 20 inches."

Messrs. J. Fittarlin, Campbell & Co.'s fortnightly report: "We have had a sensitive fluctuating market during the fortnight, ending June 1st. It was firm and active up to the 26th, when the advice of charterers for second fortnight of April of 2400 tons fine to Europe and 200 to America caused a marked reaction, with a decline of 30/ to 40/ on Chili bars. Our closing quotations are £73.15 to £74, for good ordinary Chili bars, 14/9 to 15/8 for ores and regulus, 16/ to 16/3 for Coro Coro Barilla. Sales for the fortnight consists of 1924 tons ore at Swansea at 14/6 to 15/, and 1535 tons argentine regulus on private terms; also 275 tons bars at £74 to £75 per ton, 550 tons regulus to arrive here at 15/3, and on the spot here 1780 tons bars from £73 to £78 cash terms, and 125 tons bars at £75, three months prompt. At the Swansea sale on the 26th, 1782 tons ore, average nineteen per cent. produce, sold at an average of 14/10½. Stocks of copper (Chilian

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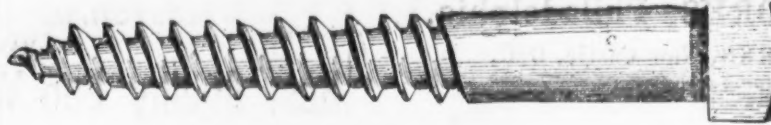
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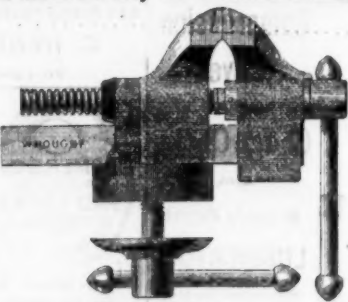
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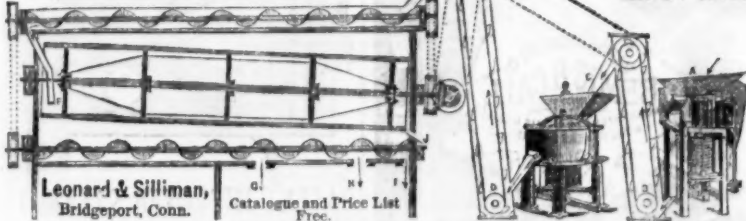
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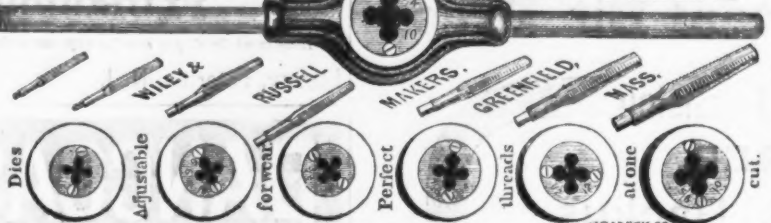
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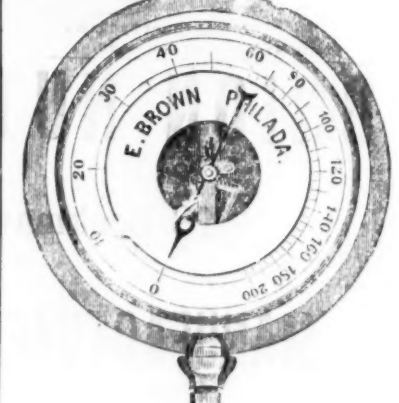
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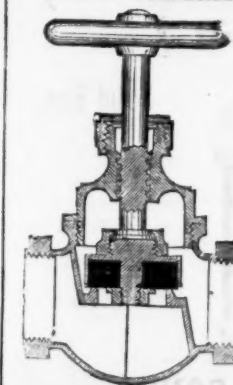
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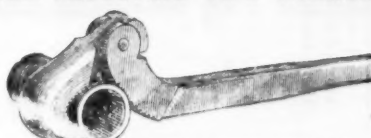
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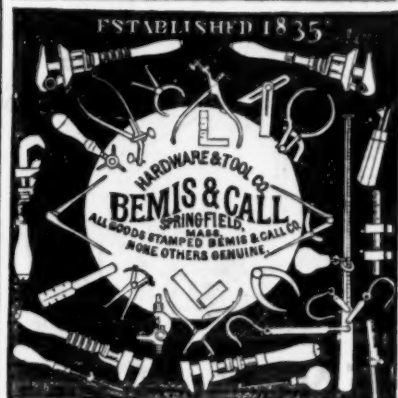
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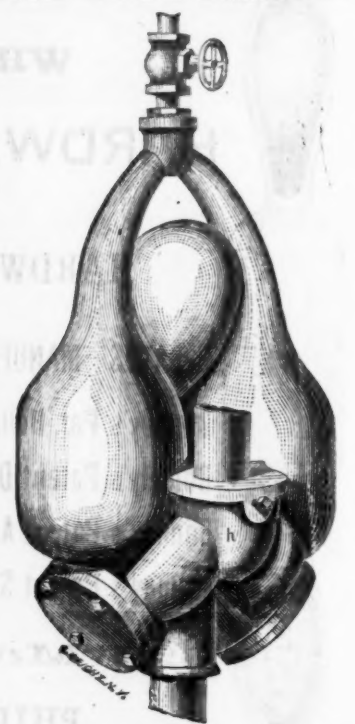
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The Iron Age Directory

and Index to Advertisements.

	PAGE
Agricultural Steels and Tools, etc., Makers of.	
Fells, A. J. & Co., Pittsburg, Pa.	26
Alarm Tills.	
Tucker's Alarm Till Mfg. Co., Indianapolis, Ind.	29
Alloys, Manufacturers of.	
Fisher & Norris, Trenton, N. J.	23
Artists' Materials.	
Kaufel & Esar, 160 Fulton, N. Y.	36
A-Heats Roofing.	
Johns H. W., 87 Maiden Lane, N. Y.	9
Ancers.	
Elinora Nobles Mfg. Co., Elmira, N. Y.	11
Ancers, Rits, etc., Manufacturers of.	
Shattuck W. F. & Co., 13 Chambers, N. Y.	9
Stearns G. N., Syracuse, N. Y.	21
A-Steel Springs, etc., Manufacturers of.	
Clark, Smith & Co., Fort Plain, N. Y.	12
Hutchins G. & Co., Field, Brooklyn, E. D.	31
J. Palmer & Co., Concord, N. H.	12
Westworth H. M. & Co., Gardiner, Me.	12
Band Saw Machines, Makers of.	
First & Pritchard, 481 W. 4th St., N. Y.	35
Band Saws and Tools for Brazing &c., Importers of.	
Gustaf George & Son, 99 W. 4th, N. Y.	10
Barn Door Hangers.	
Rider, Wooster & Co., Walden, N. Y.	29
Bare Knobs.	
E. Peck Mfg. Co., Bristol, Ct.	6
Bellows, Manufacturers of.	
Churchard, Joseph, Buffalo, N. Y.	24
Newcomb Bros., 386 Water, N. Y.	6
Belted Leather, Makers of.	
Alexander Bros., 100 N. 3rd, Phila.	28
Bradford & Sharp, Cincinnati, O.	28
Page Belting Co., 24 Exchange St., Boston	28
Bird Cages, Makers of.	
Lindeman O., 150 Germantown Ave., Phila.	9
Maximilian John, 249 Pearl, N. Y.	9
Bit Braces, Manufacturers of.	
Rackus Q. S., Winchendon, Mass.	22
Batholomew C. W. & H. S., Bristol, Ct.	13
Muller's Mills Mfg. Co., 75 Beekman, N. Y.	20
Boilers, Steam.	
Tanner Wm. E. & Co., Richmond, Va.	16
Bolt Heading Machines, Manufacturers of.	
Chapin Machine Co., 100 N. 3rd, Phila.	28
Piano, Burdett & Barnard, Buffalo, N. Y.	35
Bolt Machinery.	
American Bolt Co., Lowell, Mass.	18
Borax.	
Beach & Co., Hartford, Ct.	3
Brass, Manufacturers of.	
Ansonts Brass and Copper Co., 19 Cliff, N. Y.	2
Benedict & Burroughs Mfg. Co., Waterbury, Conn.	2
Brooklyn Brass & Copper Co., 100 John, N. Y.	2
David John & Sons, 100 John, N. Y.	2
Major Edward & Co., 4 Warren, N. Y.	2
Fleming & Brown, 100 John, N. Y.	2
Scott Mfg. Co., 4 Beekman, N. Y.	2
Waterbury Brass Co., 4 Beekman, N. Y.	2
Brick Presses, Makers of.	
Carnell Geo., 150 Germantown Ave., Phila.	22
Carnell F. L. & D. R., 150 Germantown Ave., Phila.	22
Miller Samuel P., 308 S. Fifth, Philadelphia	22
Bridge Builders.	
Moseley and Roof Co., 5 Deo, N. Y.	4
Bricks and Shells, etc., Manufacturers of.	
Wilson John, Sheffield, England	29
Burr Stone Flouring and Grist Mills.	
Leonard & Sullivan, Bridgeport, Ct.	21
Butts and Hinges, Makers of.	
American Butts & Hinges, R. I.	24
American Spiral Spring Butts Co., 21 Park Row, N. Y.	24
Crooke & Co., 180 Mulberry, N. Y.	29
Rov & Co., 180 Mulberry, N. Y.	29
Stanley Works, 75 Chambers, N. Y.	29
Union Mfg. Co., 99 Chambers, N. Y.	29
Cabinet Hardware, Manufacturers of.	
Lauders, Fray & Co., 100 Broadway, N. Y.	11
Carpenter's Tools, Makers of.	
Towhead, Wilson & Hubbard, Phila.	12
Carriage Hardware, Makers of.	
Smith H. D. & Co., Plattsburgh, Ct.	12
Car Wheels, etc., Manufacturers of.	
Jackson & Ward, 100 N. 3rd, Phila.	4
Taylor Iron Works, High Bridge, N. J.	4
Chains, Makers of.	
Cala, Gordon & Co., 145 Richmond, Phila.	24
Kennedy & Rankin, Trenton, N. J.	24
Wyatt Thos., 771 Eddy, Providence, R. I.	24
Chisels, Manufacturers of.	
Barton D. H., Rochester, N. Y.	10
Buck Bros., 100 N. 3rd, Phila.	10
Clothes Wringers, Manufacturers of.	
Providence Tool Co., 11 Warren, N. Y.	21
Coal, Miners of.	
Pardee A. & Co., 111 Broadway, N. Y.	24
Coal Hods, Manufacturers of.	
Easterbrook Wm., 31 Cherry, Phila.	26
Ohio Coal Hod Co., 47 E. Front, Cincinnati, O.	19
Smith, Burns & Co., 40 Cliff, N. Y.	28
Coffee and Spice Mills.	
Lane Brothers, Millbrook, N. Y.	3
Enterprise Mfg. Co., Philadelphia, Pa.	30
Commission Merchants, English.	
Goddard Samuel A. & Co., Birmingham, Eng.	2
Compasses and Tools, etc., Manufacturers of.	
Boule & Call Hard, & Tool Co., Springfield, Mass.	22
Cooper's Tools, etc., Dealers in.	
Little Chas. E., 59 Fulton, N. Y.	8
Swan & Brombacher, 33 & 34 Fulton, N. Y.	8
Corrugated Sheet Pipe, etc., Makers of.	
Corrugated Metal Co., East Berlin, Conn.	4
Crucibles, Manufacturers of.	
Newkumet Adam, 157 N. Front, Phila.	22
Ross & Hufferkamp, 148 N. 3rd, Phila.	18
Stow, Wile & Co., 100 Market, Phila.	18
Taylor Robert & Co., 100 to 105 Caldwail, Phila.	18
Curry Combs, Manufacturers of.	
Bartholomew C. W. & H. S., Bristol, Ct.	34
Kellogg W. P. & Co., Troy, N. Y.	34
Cutlery, Importers of.	
Baker Hermann & Co., 191 Duane, N. Y.	29
Carlyle Wm. A., Cortlandt, N. Y.	11
Dickinson Henry, 66 and 68 Reade, N. Y.	11
Fisher John, 411 Commerce, Phila.	11
Friedman & Lutterling, 14 Warren, N. Y.	11
King H. & J., 30 Chambers, N. Y.	11
Peace Chas. Jr., 31 Chambers, N. Y.	11
Peters Bros., 81 Chambers, N. Y.	11
Tillman A. & Co., 51 Commerce, Phila.	11
Ward Asine, 101 Duane, N. Y.	11
Wilson Hawk, 101 Duane, N. Y.	11
Taylor Thomas, 41 Chambers, N. Y.	11
Cutlery, Manufacturers of.	
American Knife Co., Thomaston, Conn.	10
Burkhead Aaron, 200 Clark, 200 Broadway, N. Y.	11
Lauders, Fray & Co., 100 Broadway, N. Y.	11
Miller Bros. Cutlery Co., W. Meriden, Conn.	11
New York Knife Co., 100 N. 3rd, Phila.	11
Wood Cutlery Co., Andover, N. H.	11
Differential Pulley Blocks, Makers of.	
Van Wart & McCoy, 43 Chambers, N. Y.	30
Door and Gate Springs.	
The Challenge Door Spring Co., 49 Ann, N. Y.	36
Van Wagner & Williams, 21 Park Row	36
Dredging, and Makers of Dredging Machines.	
Am. Dredging Co., 214 S. Delaware ave., Phila.	36
Drill Chucks, Manufacturers of.	
Hull F. A. & Co., 100 N. 3rd, Phila.	33
Lambertville Iron Works, Lambertville, N. J.	33
Drilling Machines, Makers of.	
Gill George W., 21 North 5th, Philadelphia	34
Miller F. A. & Co., 100 N. 3rd, Phila.	34
Thorne & DeHaven, Philadelphia	34
Drop Forgings.	
Phila. Forging Works, Kensington, Philadelphia	27
Edge Tools, Makers of.	
Bradley G. W., 31 Chambers, N. Y.	6
Elevators, Makers of.	
Howard Geo. C., 117 S. 19th, Phila.	36
Ous Bros. & Co., 318 Broadway, N. Y.	9
Emerys.	
The Union Stone Co., 16 Exchange, Boston	29
Emery Cloth.	
The Union Stone Co., 16 Exchange, Boston	29
Emery Wheels, Makers of.	
Tait Company, 100 Broadway, Boston	29
The Union Stone Co., 16 Exchange, Boston	29
Engineers, Machinists, etc.	
Henshall James, 106 Beach, Phila.	35
James Moore, 106 Beach, Phila.	35
Engines, Steam, Makers of.	
Mackin Machine Co., Fitchburg, Mass.	34
New York Steam Engine Co., 85 Chambers, N. Y.	34
Shapley & Wells, 14 Warren, N. Y.	36
Tanner Wm. E. & Co., Richmond, Va.	36
Woodruff Iron Works, Hartford, Conn.	34
Engravers, Wood.	
Hitchcock Jas., 31 Spruce, N. Y.	4
Faucets, Self-Measuring, Makers of.	
Enterline Mfg. Co. of Pa., Phila. and N. Y.	30
Faucets, Importers of.	
Car J. & H., 100 John, N. Y.	32
Dickinson Henry, 66 and 68 Reade, N. Y.	11
Fisher Joseph S., 61 Commerce, Phila.	11
Fraser Peter A. & Co., 30 Fulton, N. Y.	11
Moss F. W., 30 John, N. Y.	11
Sanderson Bros. & Co., 15 Chambers, N. Y.	11
Spears & Jackson, 15 Chambers, N. Y.	11
Filles, Mfg. Manufacturers of.	
Auburn Mfg. Works, Auburn, N. Y.	8
Barnett G. & H. A. and Richmond, Phila.	8
McCaffrey & Bro., 132 and 134 N. 3rd, Phila.	8
Nicholson File Co., Providence, R. I.	8
Wheeler, Clements & Co., Middlebury, N. Y.	8
Walsh, Corbett & Flagler, 88 Chambers, N. Y.	8

Fire Bricks, Makers of.	
Brooklyn City Retort and Fire Brick Works, Van Dyke, Brooklyn, N. Y.	23
Hall A. & Sons, Perth Amboy, N. J.	23
Hall A. & Sons, Buffalo, N. Y.	23
Kreischer A. & Son, 48 Goerck, N. Y.	23
Newkumet Philip, 2nd and Vine, Phila.	23
Palmer, Newton & Co., Albany, N. Y.	23
Salamander Works of Woodbridge, N. J., foot of Bethune St., N. Y.	23
Watson John R., Perth Amboy, N. J.	23
Fishing Tackle.	
Shipley A. B. & Son, 506 Commerce, Phila.	3
Fluting Machines.	
Meyers Mfg. Co., 200 Centre, N. Y.	10
Turner W. D. Co., Geneva, Ill.	10
Flint and Emery Paper and Cloth.	
Baeder Adamson & Co., 130 Market, Phila.	30
Galvanized Iron.	
Lefferts Marshall Jr., 90 Beekman, N. Y.	4
Whitman S., Greenport, L. I.	4
Giant Nail Extractor.	
Maitby, Curtis & Co., Waterbury, Ct.	30
Glass, Importers of.	
Downing A. C. & Co., 31 Beekman, N. Y.	27
Governors.	
Shive Governor Co., Bethlehem, Pa.	31
Grindstones.	
Shepard Sidney & Co., Buffalo, N. Y.	26
Wood Walter H., 233 and 235 Front, N. Y.	26
Gunpowder, Makers of.	
Kneeland F. L. (DuPont) 70 Wall, N. Y.	52
Lafin & Rand Powder Co., 21 Park Row, N. Y.	52
Hammers, etc., Manufacturers of.	
Emmet Hammer Co., Brooklyn, E. D. N. Y.	8
Nelson Tool Works, 187 E. 3rd, N. Y.	8
Hardware, Brass and Galvanized.	
Tiebout W. & J., 200 Pearl, N. Y.	2
Hardware, Commis.-Merchants.	
Fernald & Elie, 100 Chambers, N. Y.	21
Green R. M., 100 Chambers, N. Y.	21
Graham & Haines & Chambers, N. Y.	21
Hartbridge Geo. B., 99 Chambers, N. Y.	21
Walsh, Corbett & Flagler, 88 Chambers, N. Y.	21
Hardware Dealers.	
Linton, Kellogg & Co., San Francisco, Cal.	20
Jovis, Supplies & Walton, 55 Market, Phila.	20
Quackenbush, Townsend & Co., 40 Rode, N. Y.	20
Shepard Sidney & Co., Buffalo, N. Y.	20
Turner, Seymour & Judas, 64 Duane, N. Y.	20
Hardware Importers.	
Beam & Murray, 81 Chambers, N. Y.	29
Baker Hermann & Co., 101 Duane, N. Y.	29
Field Alfred & Co., 47 John, N. Y.	29
King H. & J., 30 Chambers, N. Y.	10
Van Wart & McCoy, 43 Chambers, N. Y.	10
Turner A. A., 37 Chambers, N. Y.	10
Windmiller Louis & Roelker, 20 Rode, N. Y.	10
Hardware Manufacturers.	
Biddle Mfg. Co., 75 Chambers, N. Y.	21
Caterpillar Mfg. Co., Phila.	21
Hart, Bilven & Mead Mfg. Co., 240 Pearl, N. Y.	21
Jacobs & Nimeck Mfg. Co., 99 Chambers, N. Y.	21
Lane, Gale & Co., Troy, N. Y.	21
Many & Marshall, 65 Warren, N. Y.	21
Middleton Tool Co., 11 Warren, N. Y.	21
Schweitzer Mfg. Co., 37 Rode, N. Y.	21
Shattuck W. F. & Co., 113 Chambers, N. Y.	21
Stanley Works, 75 Chambers, N. Y.	21
The Weathered Novelty Co., 100 Rode, N. Y.	21
Turner, Seymour & Judas, 64 Duane, N. Y.	21
Union Mfg. Co., 99 Chambers, N. Y.	21
Williams & Churchill, 25 Warren, N. Y.	21
Wilson Mfg. Co., 37 Chambers, N. Y.	21
Hardware Specialties.	
Bryington & Northup, Rochelle, Ill.	23
Hart & Co., 130 Centre, N. Y.	23
Pugsley & Chapman, 6 Gold, N. Y.	23
Shepard Sidney & Co., Buffalo, N. Y.	23
Wiley & Russell, Greenfield, Mass.	23
Helve Hammers, Makers of.	
Bradley Mfg. Co., Syracuse, N. Y.	21
Holding Engines, Makers of.	
Howard Geo. C., 117 S. 19th, Philadelphia	36
Ode Bros. & Co., 34 Broadway, N. Y.	36
Todd & Rafferty Machine Co., 10 Barclay, N. Y.	36
Horse Hay Forks and Fixtures, Makers of.	
McDonald & Gordon, Rushford, N. Y.	24
Nella A. & Co., Pittsburgh, Pa.	24
Horse Nails, Makers of.	
Ansible Horse Nail Co., 35 Chambers, N. Y.	24
Brundage & Co., Middletown, N. Y.	24
Globe Nail Co., Boston, Mass.	24
Pratt & Co., Buffalo, N. Y.	24
Putnam S. S. & Co., Neponset, Mass.	24
Horse Shoes, Makers of.	
Burden Iron Works, Troy, N. Y.	4
Hydraulic Jacks.	
Dudgeon Richard, 24 Columbia, N. Y.	24
Ice Cream Freezers.	
Gooch Chas., 422 Market, Phila.	8
Insurance, Reins.	
Hartford Steam Boiler and Inspection Co.	35
Insurance, Fire.	
Amazon Insurance Co., Cincinnati, O.	4
Iron Brokers.	
Boynton Geo. A., 20 Wall, N. Y.	6
Crane U. O., 101 John, N. Y.	6
Hazard & Jones, 21 Pearl, N. Y.	6
Read & Dickey, Cleveland, O.	36
Iron, Carriage, etc., Manufacturers of.	
Corrugated Metal Co., East Berlin, Conn.	4
Moely Iron Bridge and Roof Co., 3 Deo, N. Y.	4
Iron, Charcoal, Warm or Cold Blast.	
Gulcher John W., 95 William, N. Y.	6
Iron Commission Merchants.	
Althous & Umberger, 341 Walnut, Philadelphia	6
Blackstone & Co., 330 Walnut, Phila.	6
Hand Jas. C. & Co., 614 and 616 Market, Phila.	6
Hoopes Wm. Graham, 49 Walnut, Phila.	6
Mallin Bros., 28 Dock, Phila.	6
Iron, Pig, Importers of.	
Williamson James & Co., 69 Wall, N. Y.	4
Iron Dealers.	
Abeel Brothers, 120 South, N. Y.	4
Bonnell, Rotford & Co., Youngstown, O.	4
Dugan & Lovell, 70 and 72 West, N. Y.	4
Cleveland, Brown & Co., Cleveland, O.	4
Coddington T. B. & Co., 25 Cliff, N. Y.	4
Conkling H. & J., 30 Chambers, N. Y.	4
Fuller, Lord & Co., 189 Greenwich, N. Y.	4
Fuller, Dana & Pitt, 110 North, Boston	4
Bardner Wm., 35 Grand, N. Y.	4
Harrison & Gilliam, 35 to 362 Water, N. Y.	4
Hart G. A., 208 Walnut, Phila.	4
Holden, Hopkins & Stokes, 101 John, N. Y.	4
Jackson & Chase, 26 and 28 Franklin, N. Y.	4
Judson B. F., 47 and 49 Water, N. Y.	4
Matthews Chas. W., 138 Walnut, Phila.	4
Mohr J. J., Philadelphia	4
Packard, Goff & Co., Youngstown, O.	4
Petree & Mann, 28 and 29 South, N. Y.	4
Hoffe Wm. John, 30 Water, N. Y.	4
Piereson & Co., 24 Broadway, N. Y.	4
Quincy John W., 35 William, N. Y.	4
Richards D. W. & Co., 21 Grand, N. Y.	4
Smith Gam' G. & Co., 342 Pearl, N. Y.	4
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Williams & Tanner, 16 Duane, N. Y.	4

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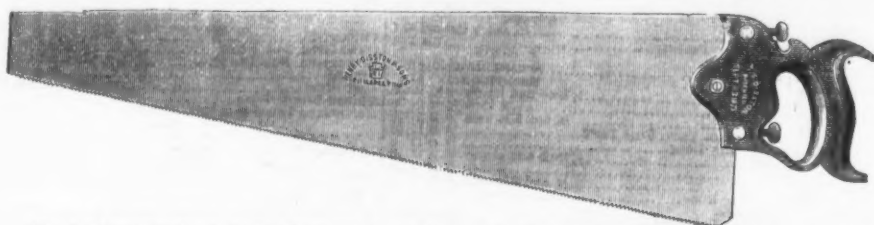
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Manufacturers of SHEET STEEL, and all Articles made from Sheet Steel.

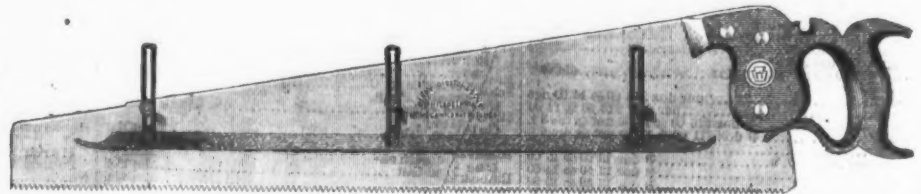
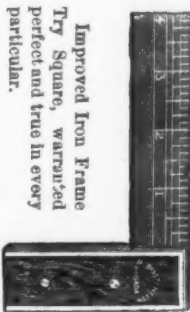
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Also, FILES, TOOLS, Etc., and all kinds of Labor Saving Implements for keeping Saws in perfect order.



Hand Saw with adjustable handle. The thumb screws in the handle operate on the butt of the saw blade, and can be so adjusted as to give the blade any desired pitch.

Improved Iron Frame
Try Square, warranted
perfect and true in every
particular.



Patent adjustable Gauge Saw for sawing tenons, kerfing, or any work where the cut is required to be of definite depth. Will pay for itself in one day. Try it and be convinced. Remove the gauge and use as an ordinary saw.



Compass Saw, Keystone Tooth—it cuts with or across the grain with equal facility.

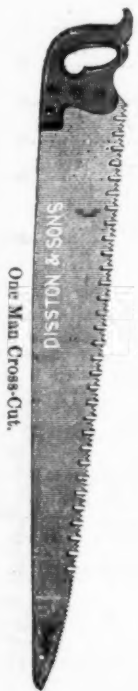
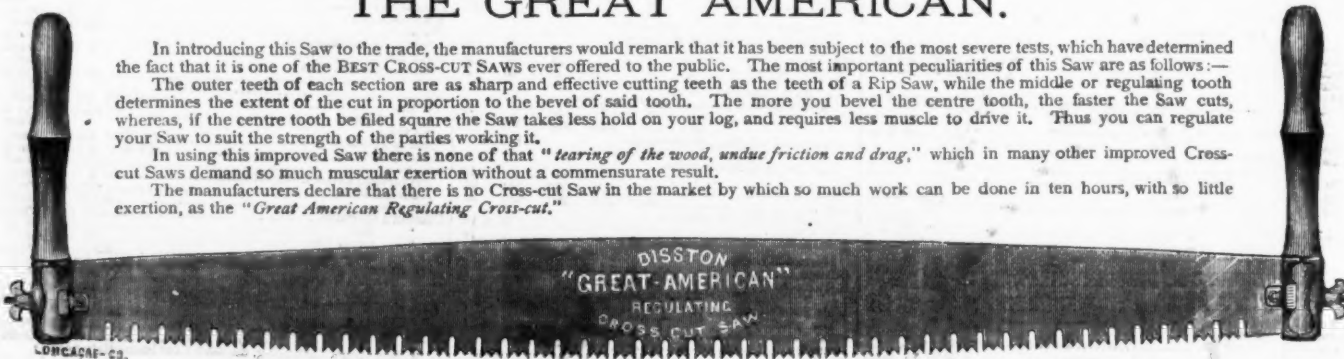


Hack Saw. The high will be readily appreciated by mechanics.

THE GREAT AMERICAN.

In introducing this Saw to the trade, the manufacturers would remark that it has been subject to the most severe tests, which have determined the fact that it is one of the BEST CROSS-CUT SAWS ever offered to the public. The most important peculiarities of this Saw are as follows:—
The outer teeth of each section are as sharp and effective cutting teeth as the teeth of a Rip Saw, while the middle or regulating tooth determines the extent of the cut in proportion to the bevel of said tooth. The more you bevel the centre tooth, the faster the Saw cuts, whereas, if the centre tooth be filed square the Saw takes less hold on your log, and requires less muscle to drive it. Thus you can regulate your Saw to suit the strength of the parties working it.

In using this improved Saw there is none of that "tearing of the wood, undue friction and drag," which in many other improved Cross-cut Saws demand so much muscular exertion without a commensurate result.
The manufacturers declare that there is no Cross-cut Saw in the market by which so much work can be done in ten hours, with so little exertion, as the "Great American Regulating Cross-cut."



One Man Cross-Cut.

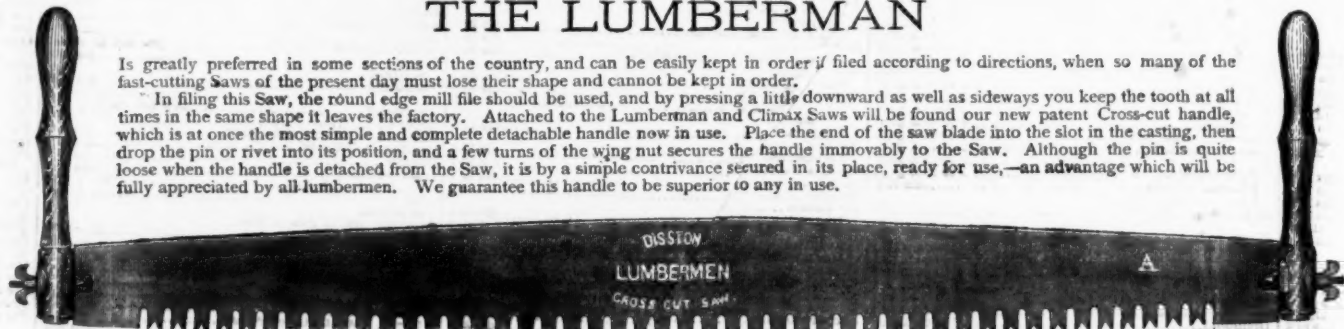


Improved Pruning Saw and Knife. Patented August 29, 1873.

THE LUMBERMAN

Is greatly preferred in some sections of the country, and can be easily kept in order if filed according to directions, when so many of the fast-cutting Saws of the present day must lose their shape and cannot be kept in order.

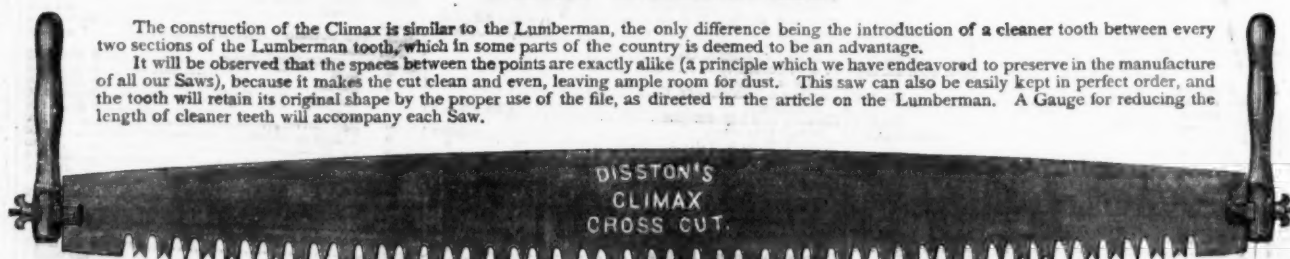
In filing this Saw, the round edge mill file should be used, and by pressing a little downward as well as sideways you keep the tooth at all times in the same shape it leaves the factory. Attached to the Lumberman and Climax Saws will be found our new patent Cross-cut handle, which is at once the most simple and complete detachable handle now in use. Place the end of the saw blade into the slot in the casting, then drop the pin or rivet into its position, and a few turns of the wing nut secures the handle immovably to the Saw. Although the pin is quite loose when the handle is detached from the Saw, it is by a simple contrivance secured in its place, ready for use,—an advantage which will be fully appreciated by all lumbermen. We guarantee this handle to be superior to any in use.



THE CLIMAX.

The construction of the Climax is similar to the Lumberman, the only difference being the introduction of a cleaner tooth between every two sections of the Lumberman tooth, which in some parts of the country is deemed to be an advantage.

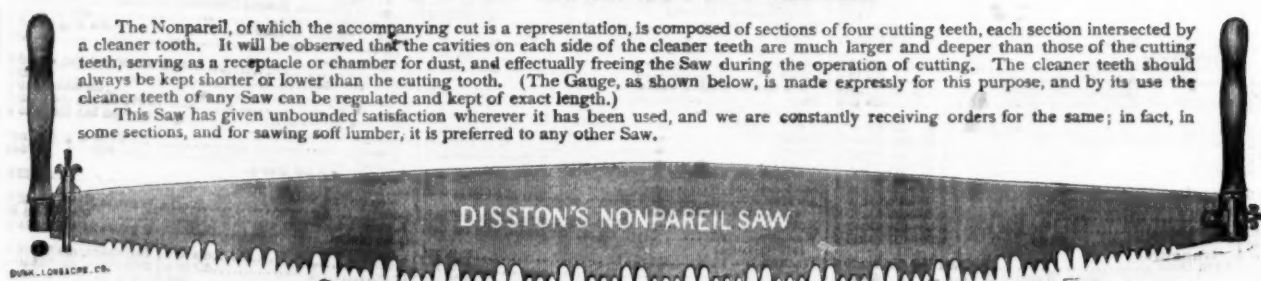
It will be observed that the spaces between the points are exactly alike (a principle which we have endeavored to preserve in the manufacture of all our Saws), because it makes the cut clean and even, leaving ample room for dust. This saw can also be easily kept in perfect order, and the tooth will retain its original shape by the proper use of the file, as directed in the article on the Lumberman. A Gauge for reducing the length of cleaner teeth will accompany each Saw.



THE NONPAREIL.

The Nonpareil, of which the accompanying cut is a representation, is composed of sections of four cutting teeth, each section intersected by a cleaner tooth. It will be observed that the cavities on each side of the cleaner teeth are much larger and deeper than those of the cutting teeth, serving as a receptacle or chamber for dust, and effectually freeing the Saw during the operation of cutting. The cleaner teeth should always be kept shorter or lower than the cutting tooth. (The Gauge, as shown below, is made expressly for this purpose, and by its use the cleaner teeth of any Saw can be regulated and kept of exact length.)

This Saw has given unbounded satisfaction wherever it has been used, and we are constantly receiving orders for the same; in fact, in some sections, and for sawing soft lumber, it is preferred to any other Saw.



A cheap Saw, fully guaranteed. Six tools in one. Adapted to farmers' or plantation use. A Rip and Cross-Cut Saw, Square, Rule, Straight Edge and Scratch Awt combined.

Gauge for Regulating Cleaning Teeth.

The cleaning teeth of all saws should be somewhat shorter than the cutting teeth, and, although shortened, they should be of uniform length throughout. The inner edge of the Gauge rests on the points of the cutting teeth, the cleaning teeth projecting through the opening in centre of Gauge. Reduce the projecting points, by means of a file, until arrested by the edges of the Gauge, which is made of hardened steel. Thus tooth after tooth can be rapidly and correctly reduced to an even length by any unskilled operator



Showing the Gauge in Position for Filing the Cleaner Teeth

1 HARDWARE.

[illegible][illegible][illegible]

Planished Oval O. G. Urns.....	dis 25
Each.....	7 8
Each.....\$4.30 5 45 6 50 7 00 7 75 9 25 11 25 13 25 15 00	
Planished Round Urns.....	dis 25
Each.....	7 8
Each.....\$4.30 4 35 5 45 6 50 7 75 9 00 11 00 12 00	
Planished Round Oyster Dishes, (Complete).....	dis 25
Each.....	1 2
Each.....	\$3.10
Planished Oyster Dish Plates.....	dis 25
Each.....	1 2
Oyster.....	\$6.25 93
Oyster Dish Covers.....	dis 25
Each.....	1 2
Each.....	\$6.30 93
<i>Tea Pot Handles—P. S. & W.....</i>	dis 25
Stow's Patent Hollow Tea Pot Handles.....	
No. 1, Small 4, 4 inches.....	per gross, \$1.15
No. 2, Medium 5, 5 inches.....	1.25
No. 3, Large, 6, 6 inches.....	1.35
No. 4, Ex. Large, 7, 7 in., for Wash Pitcher.....	1.50
Stow's Patent New Pattern.....	
No. 25, Small, 4, 4 inches.....	per gross, \$1.15
No. 26, Medium, 5, 5 inches.....	1.25
No. 40, Large, 6, 6 inches.....	1.30
Solid Iron, Tin Tipped.....	\$3.00
No. 10, Small, 4, 4 inches.....	per gross, \$9.00
No. 15, Medium, 5, 5 inches.....	9.50
No. 20, Large, 6, 6 inches.....	10.00
Stow's Patent Hollow Tea Pot Handles, Adamantine Brouze—P. S. & W.....	
No. 12, Bronzed and Tin-Tipped.....	per gross, \$13.50
<i>Stainless Handles, Or Desirable Iron.</i>	
P. S. & W.....	dis 25
Japanned.....	
No. 1, 5 inches long.....	per gross, \$2.50
No. 2, 6 ".....	2.75
No. 3, 6 ".....	3.00
No. 4, 7 ".....	3.25
No. 5, 8 ".....	3.50
No. 6, 9 ".....	3.75
Tinned.....	
No. 1, 5 inches long.....	per gross, \$1.25
No. 2, 6 ".....	1.50
No. 3, 6 ".....	1.75
No. 4, 7 ".....	2.00
No. 5, 8 ".....	2.25
No. 6, 9 ".....	2.50
Unfinished.....	per lb, 7
Tinned.....	

No. 29.....	0.18	0.22	0.28
No. 30.....	0.24	0.28	0.34
No. 31.....	0.30	0.34	0.40
No. 32.....	0.36	0.40	0.46
No. 33.....	0.42	0.46	0.52
No. 34.....	0.48	0.52	0.58
No. 35.....	0.54	0.58	0.64
No. 36.....	0.60	0.64	0.70
No. 37.....	0.66	0.70	0.76
No. 38.....	0.72	0.76	0.82
No. 39.....	0.78	0.82	0.88
No. 40.....	0.84	0.88	0.94
No. 41.....	0.90	0.94	1.00
No. 42.....	0.96	1.00	1.06
No. 43.....	1.02	1.06	1.12
No. 44.....	1.08	1.12	1.18
No. 45.....	1.14	1.18	1.24
No. 46.....	1.20	1.24	1.30
No. 47.....	1.26	1.30	1.36
No. 48.....	1.32	1.36	1.42
No. 49.....	1.38	1.42	1.48
No. 50.....	1.44	1.48	1.54
No. 51.....	1.50	1.54	1.60
No. 52.....	1.56	1.60	1.66
No. 53.....	1.62	1.66	1.72
No. 54.....	1.68	1.72	1.78
No. 55.....	1.74	1.78	1.84
No. 56.....	1.80	1.84	1.90
No. 57.....	1.86	1.90	1.96
No. 58.....	1.92	1.96	2.02
No. 59.....	1.98	2.02	2.08
No. 60.....	2.04	2.08	2.14
No. 61.....	2.10	2.14	2.20
No. 62.....	2.16	2.20	2.26
No. 63.....	2.22	2.26	2.32
No. 64.....	2.28	2.32	2.38
No. 65.....	2.34	2.38	2.44
No. 66.....	2.40	2.44	2.50
No. 67.....	2.46	2.50	2.56
No. 68.....	2.52	2.56	2.62
No. 69.....	2.58	2.62	2.68
No. 70.....	2.64	2.68	2.74
No. 71.....	2.70	2.74	2.80
No. 72.....	2.76	2.80	2.86
No. 73.....	2.82	2.86	2.92
No. 74.....	2.88	2.92	2.98
No. 75.....	2.94	2.98	3.04
No. 76.....	3.00	3.04	3.10
No. 77.....	3.06	3.10	3.16
No. 78.....	3.12	3.16	3.22
No. 79.....	3.18	3.22	3.28
No. 80.....	3.24	3.28	3.34
No. 81.....	3.30	3.34	3.40
No. 82.....	3.36	3.40	3.46
No. 83.....	3.42	3.46	3.52
No. 84.....	3.48	3.52	3.58
No. 85.....	3.54	3.58	3.64
No. 86.....	3.60	3.64	3.70
No. 87.....	3.66	3.70	3.76
No. 88.....	3.72	3.76	3.82
No. 89.....	3.78	3.82	3.88
No. 90.....	3.84	3.88	3.94
No. 91.....	3.90	3.94	4.00
No. 92.....	3.96	4.00	4.06
No. 93.....	4.02	4.06	4.12
No. 94.....	4.08	4.12	4.18
No. 95.....	4.14	4.18	4.24
No. 96.....	4.20	4.24	4.30
No. 97.....	4.26	4.30	4.36
No. 98.....	4.32	4.36	4.42
No. 99.....	4.38	4.42	4.48
No. 100.....	4.44	4.48	4.54

Copper.....	21	22
Yellow metal.....	14	15
Brass.....	18	19
Heavy Composition.....	18	19
Old lead, soft.....	1 1/2	1 1/4
Tea lead.....	1 1/2	1 1/4
Sheet iron.....	1 1/2	1 1/4
Cast iron.....	1 1/2	1 1/4
Machinery iron.....	1 1/2	1 1/4
Pewter, No. 1.....	22	23
Pewter, No. 2.....	20	21
Spelter.....	10	11

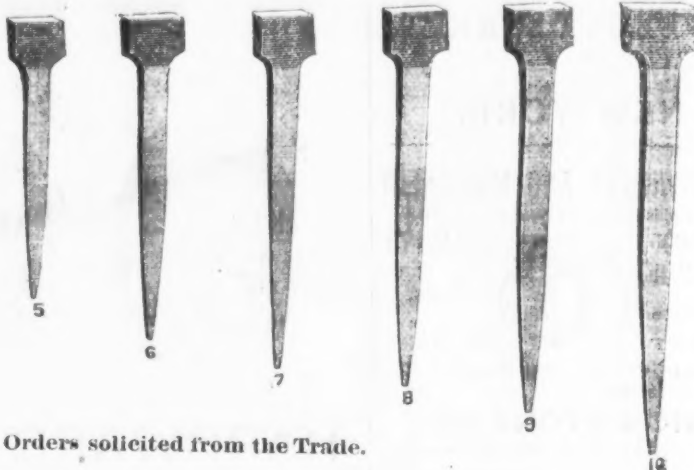
Paints, Oils, etc.

Black, lamp-coach Painters.....	7 1/2	8 1/2
Ivory Drop, fair.....	10	11
Black Paint in oil.....	10	11
Blue, Prussian, fair to best.....	10	11
Chinese, dry.....	10	11
Ultramarine.....	10	11
Brown, Spanish.....	10	11
Carmin, dry.....	10	11
Green, Chrome.....	10	11
Paris.....	10	11
Mineral Paints.....	10	11
Orange Mineral.....	10	11
Red Lead, American.....	10	11
English.....	10	11
Venetian (No. 5) dry.....	10	11
Indian, dry.....	10	11
Rose Pink.....	10	11
Sienna, American, raw.....	10	11
Tiaret.....	10	11
Umber, Burnt.....	10	11
Raw.....	10	11
Vermilion, Chinese.....	10	11
English.....	10	11
American, Common.....	10	11
White Lead, American, pure dry.....	10	11
White, Paris, English, prime.....	10	11
Yellow Ochre.....	10	11
Chrom.....	10	11
Zinc White, American No. 1 dry.....	10	11
French (Paris).....	10	11

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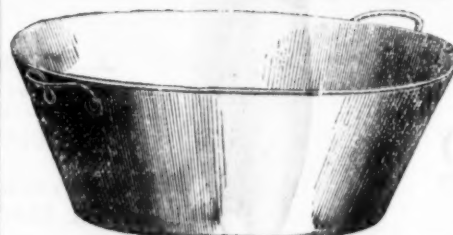
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1 1/2 x 1/2 and 1/2 square..... 160.00 @ 161.00
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1 1/2 x 1/2 and 1/2 square..... 160.00 @ 161.00

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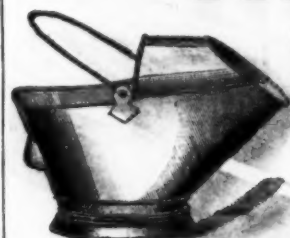
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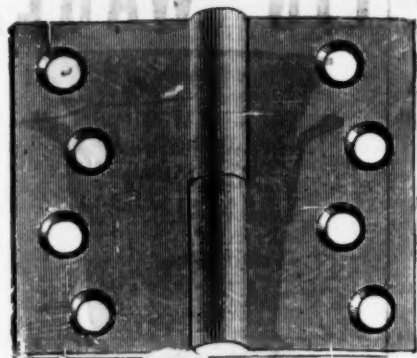
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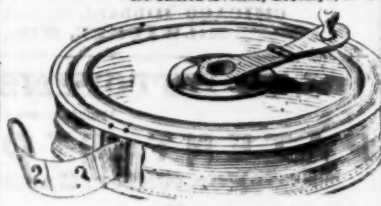
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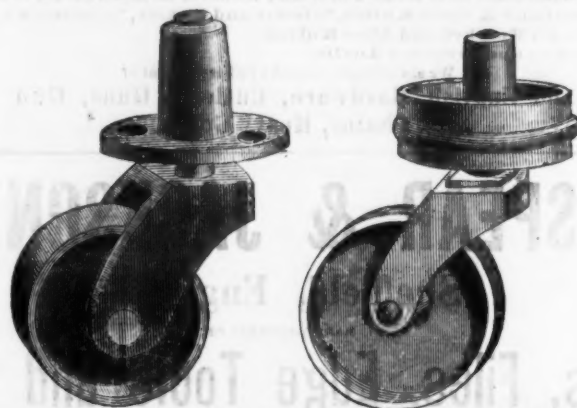
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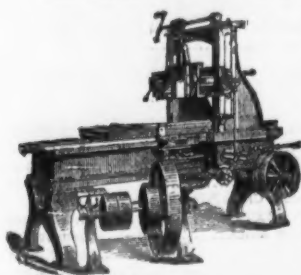
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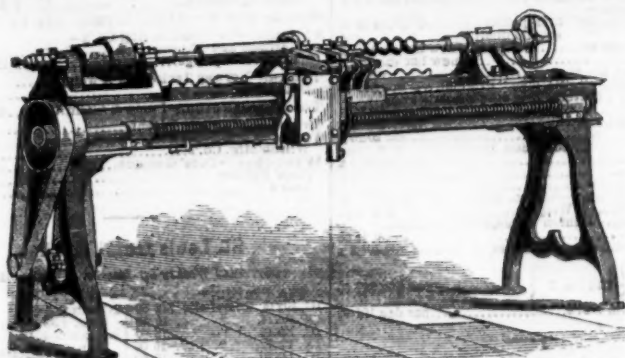
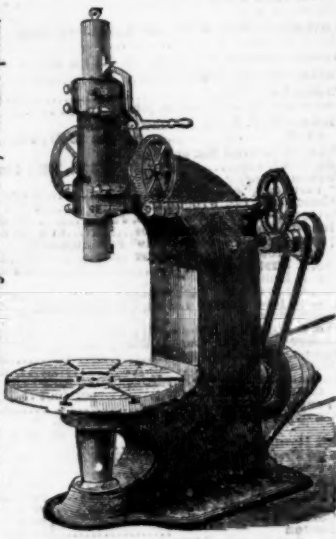
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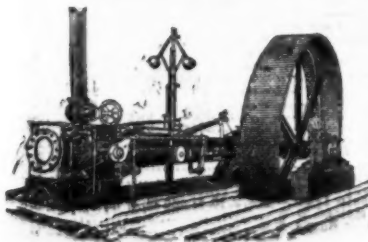
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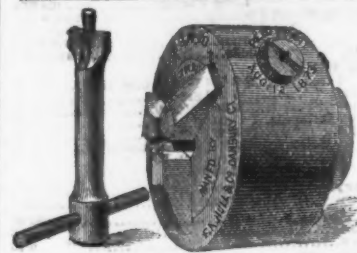
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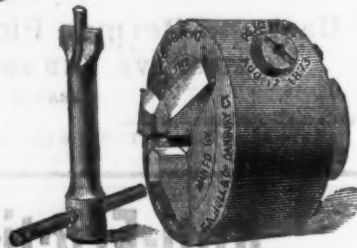
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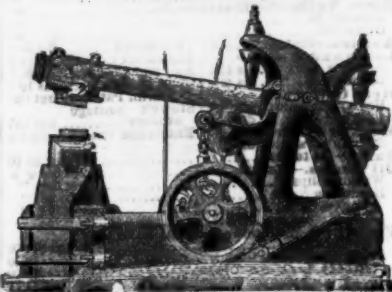


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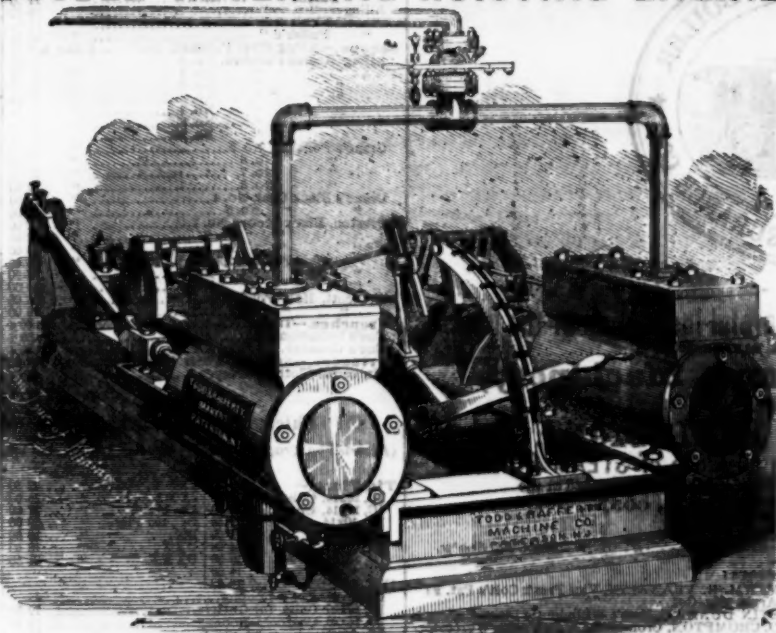
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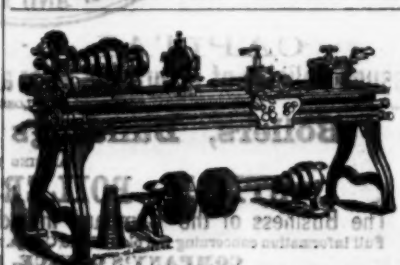
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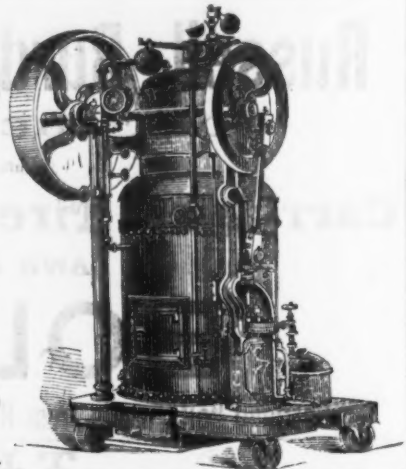
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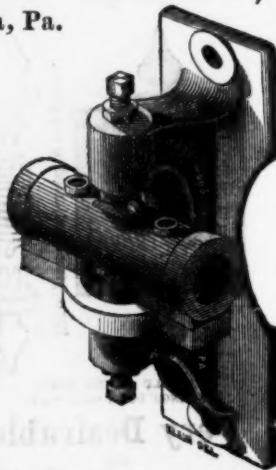
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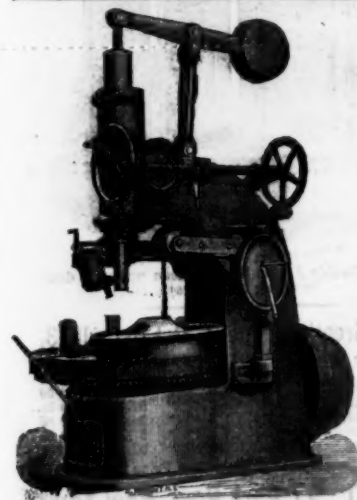
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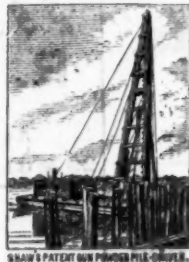
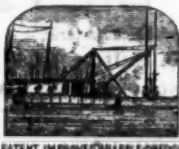
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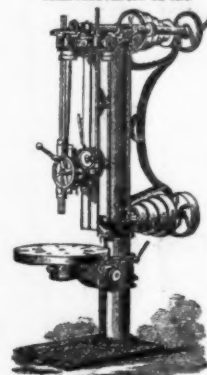
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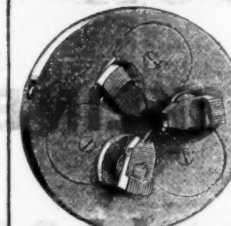
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Bennett Hotchkiss and
N. C. Stiles' Patent.

This Drop (which has been illustrated in this journal) is of that class in which the hammer is raised by a single belt or board passing up between two friction rollers, and is so well known that we will only describe our improvements. The patents we are working under are those of Bennett Hotchkiss (who is an interference case with Goulding and Cheney was declared the first inventor) and N. C. Stiles. Our improvements consist:
First.—Of an arrangement of parts that makes it the most complete Jobbing Hammer, and will take the place, to a great extent, of all other kinds for forging. In addition to the upright rod, which is operated by the hammer to open and close the rolls, we place another rod, the lower end of which is secured to the end of a lever, which is operated by the hand or foot, which operation also opens and closes the rolls at will. The lower end of this rod has a slot, so that the action of the hammer will not disturb the hand lever, thereby preventing the hand being injured, as otherwise would be the case.
Second.—No dog is used on the upright to hold up the hammer. The belt or board passes up between two clamps situated under the rolls, so arranged that as the hammer ascends they will freely open of themselves, but on descending they will close and hold up the hammer. To let the hammer fall the clamps are opened by pressure upon the foot treadle.
Third.—The board or belt is secured to the hammer by an elastic connection, which prevents the sudden jar and destruction of the same. The back roll is made adjustable to different thicknesses of board or belt, as also are the clamps. An adjustable collar on the upright rod allows the operator to obtain any height of blow desired automatically. If one blow is wanted, press upon the treadle and remove the pressure as soon as the blow is given. Keep the foot upon the treadle and the blows will be repeated until the pressure is removed. If a blow of less height than the collar is set for is required, work the hand lever, which will give you any height of blow desired. The hammer can be held up at any point below the collar by bringing the hand lever into action when the hammer is at the desired height, so that the next blow can be given from a state of rest, or less height than the collar is set for. This is a feature no other drop has; that is, the first blow struck, can be of less height than the second or third, and obtained from a state of rest. A gentle pressure upon the treadle will allow the hammer to go down slowly, but it will stop and remain suspended at any point as soon as the pressure is removed.
The clamps in holding up the hammer keep the board from touching either roll and prevents the same from being worn uneven.

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